JUN 17 1916
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Volume VII
Number 5

MAY, 1916

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THE JOURNAL OF Educational Psychology

INCLUDING EXPERIMENTAL PEDAGOGY, CHILD PHYSIOLOGY AND HYGIENE, AND EDUCATIONAL STATISTICS

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PUBLISHED MONTHLY, EXCEPT JULY AND AUGUST.
WARWICK & YORK, INC.,
LANCASTER, PA. BALTIMORE, MD.

[Entered as second-class matter at the postoffice at Lancaster, Pa., under the Act of March 3, 1879.]

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VOLUME VII MAY, 1916 NUMBER 5

THE JOURNAL OF EDUCATIONAL PSYCHOLOGY

THE UNIVERSITY OF WISCONSIN SPEECH CLINIC

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The speech clinic organized at the University of Wisconsin in 1914 by Professor O'Neill was probably the first arrangement made to deal with speech disorders among college students. Since its organization the aim and scope of the clinic has been necessarily somewhat enlarged; the work with the students with speech disorders has led naturally to a consideration of what has been done for them in the past, and what is being done in the present kindergarten and primary schools. In this way the work of the clinic touches the field of general education and perhaps a review of the year's work and the plans for the future may be of interest to the general teacher.

Professor O'Neill felt that there was a great need to do something for the many students who had poor voices, unintelligent speech, or handicapping speech disorders. The work was so new and untried that it was not quite clear how best to adapt the work to the needs of the college student. After a year's work, however, the activities of the clinic have been sytematized, methods worked out, and aims and results can now be more clearly seen.

The following table shows the scope, and the number of students treated.

Stutterers 19 m. 4 f.	23
Lispers	6
Indistinct Speech	4
Vocal Defects	24
Poor Voices	74
Fear Neuroses	2
Miscellaneous	2
Hysterical Phobia	1
Physical Affections of Nose or Throat	5
Total	141

One hundred and forty-one persons were treated, including eight members of the faculty.

The work of the clinic may be divided into four parts.

1. Treatment for poor voices.
2. Treatment for vocal defects.
3. Treatment for speech defects.
4. Training teachers for speech correction work.

Any student in the University, may receive treatment at the clinic. Each student treated has his history taken and is given a thorough medical examination of nose, throat, and larynx. Through the kind co-operation of the medical department of the University, the speech clinic is permitted to make use of the medical building and its facilities for examinations; and where knowledge of the student's general health is needed, it can be easily obtained by referring to the medical department's examination sheet of the case.

Under the heading "poor voices" are included all those who have to a marked degree monotonous or unexpressive voices, or who lack tone or inflection or vigor of speech. There are a great many in this class who wish a few lessons about how to use the voice properly but who do not wish to take the course in voice training. These students are formed into sections of ten to fifteen and given exercises to develop proper breathing for voice, change of pitch, inflection and the position of the articulative organs for the different sounds of the language. Each section meets for an hour weekly for ten weeks. Ten meetings are ordinarily necessary to acquire correct habits of breathing and speaking. There are always a few, though, who object to this tedious method and demand some short cut. These usually drop out after the first few meetings and naturally receive little good from the training.

Those suffering from vocal defects are given a very careful medical examination to determine any condition in nose or throat that might cause the defect. In some cases conditions are found that require medical or surgical treatment. After the examination sections are formed for vocal work. Aside from the section work as many thirty minute appointments are given as are required. At these appointments special exercises to fit the individual case are given and when necessary the patient is also given a thorough mental analysis. Some of the vocal defects

met with were—"very hoarse voice," "husky, squeaky voice," "falsetto, childish voice," "voice breaks when speaking." All of these vocal defects were of so severe a nature as to seriously interfere with the patients' work. A faculty member could not make his classes hear, so hoarse was his voice. One student could not major in the subjects desired because of a "squeaky, husky voice."

These abnormal conditions of the voice are but *symptoms* of mental or physical conditions. The physical causes of vocal defects are diseases or malformation of the chest or air passages, the mental causes are lack of poise, or the presence of pathological emotional conditions. In a majority of the cases the mental causes predominant were worry, habitual anxious state and nervous strain, from fear of speaking. All of these emotions express themselves through tension of the vocal mechanism causing defects. For example: a girl in the second year class had a very high pitched, almost falsetto voice. The tones were querulous and whiney. The vocal cords were over stretched and there was some infection of the tonsils but there was no physical abnormality severe enough to account for the condition. Investigation showed the cause to be that she was taking more work than her strength justified, she worried about her work constantly, she was anemic, took little exercise and felt she was carrying the burden of the world upon her shoulders. There was also a certain youthful satisfaction and a kind of grim joy over the thought of the hard time she was having.

Another case was a boy also of the second year, with a weak, hoarse voice; he was so timid and sensitive that whenever called upon to recite he became so frightened that he lost control of his breathing and his voice quite failed him. He was able speak only with great effort, and this strain gradually affected the vocal cords. Vocal re-education or medical treatment alone would be of little benefit in such cases. Exercises for relaxation must be given, and the breathing apparatus must be trained for its value in controlling emotions and inducing poise, and last in the conferences the patients must be convinced in what respect their attitude and view point towards the world is wrong. In short there must be a more or less complete mental adjustment, as well as the gaining control of the vocal mechanism in order to eliminate vocal defects.

Under the heading speech defects are included stuttering (which includes stammering), lisping and indistinct speech. Indistinct speech, when it is not due to some malformation of the articulative organs, can usually be remedied through the use of corrective phonetics. Lisping, which is much harder to treat, may be divided into three kinds,—negligent, neurotic and organic. Negligent lisping may be treated in the same way as indistinct speech; the neurotic type requires that the general health of the patient be improved, so that there is more poise of the nervous system. In the majority of cases of organic lisping there is some malformation of the jaw causing an imperfect occlusion of the teeth which prevents the tongue from easily taking the positions required to produce the correct sounds. The remedy here is to correct the formation of the jaws through the teeth.

Stuttering is the most serious speech defect that the clinic has to deal with. The cases vary in seriousness from those who have only a slight defect to those who can scarcely speak a word without contortions of face or body. Stuttering is generally admitted by neurologists to fall into the class of the psychoneuroses, and its cause has never been satisfactorily determined. I believe that it should be regarded not as a disease but as we regard fever or pain, merely a symptom of a diseased condition. This diseased condition is due to some abnormal condition of the mind. I have never seen a case of so called physical stammering.

The treatment of stuttering consists of psychoanalysis and suggestion, supplemented by vocal exercises which are based on physiological laws and planned so as to train the three fundamental parts of the vocal mechanism,—the diaphragm, the vocal cords, and the articulative organs. Each stutterer is given an association test, under standard conditions, consising of Jung's list of one hundred words supplemented by twenty words I have added. By a study of the words given in response to this test, and the presence of any inhibitions expressed in delayed or peculiar responses, a sort of bird's-eye view of the patient's personality is obtained, and also clews obtained to any complexes which may be present. Some ten or fifteen words that show inhibitions are selected and the patient is asked, while sitting quietly with eyes closed, to give all the ideas that come into his mind in relation to the complex words.

For example one stutterer gave the word "poor" sixteen times in the course of the test. When asked to give freely all the ideas associated with the word he said: "I am poor in many, many things; I have this idea so firmly that I do not like to go out and meet people; and not only am I poor in social relations but poor in college work, a little below the average. I always had the idea that others were better than I. My brother used to have great influence over me. I followed doggedly his suggestions. He used to show me that my ideas were not necessarily right, and I used to take his view point. He made me come out here, he arranged my course and made me take engineering. I always felt that I was the poor one in the family." We believe that stuttering in this case was chiefly a symptom of the deep feeling of inadequacy,—a feeling which had not been quite conscious until the association test showed to the patient how dominant was the idea "poor" in his mind. There were several other cases in which we found this deep sense of inadequacy. Before the stuttering could be cured the mental attitude had to be changed. Vocal re-education alone is quite useless.

When asking for associations with a certain word, great care is taken never to suggest anything, but to take only what the patient freely gives. After the test is over, if it is felt to be wise the facts discovered are laid before the patient and he is asked what is his interpretation of them. In the case just cited the boy was told that he had given the word "poor" sixteen times in one hundred and twenty words. He had already noticed that the word kept recurring, and he even became somewhat irritated over his involuntary repetition of it. His attention was called to the associations he had given in relation to the complex words and especially associations with the word "poor" and he admitted that he really did have a constant feeling of inferiority. Having made him realize this, an attempt was made to change his point of view and improve his confidence.

In some cases of stuttering a more definite cause was found, such as a definite phobia, mother or father complex, homo-sexual impulses. Some cases of stuttering are undoubtedly due to these causes and this is the type of case that the Freudian psychoanalysts are able to cure in a few conferences. But I do not agree with them in claiming that all stuttering is due to a definite mental trauma which can be relieved by psychoanalysis alone.

In a majority of the cases I have had, the cause was more general. Analysis revealed nothing that could be plucked out as a briar is from the hand. Perhaps this was due to the fact that the original complex causing the stammering was too deeply covered up to be brought to the surface.

I am not quite certain how much value to attach to vocal re-education though I am certain much good is accomplished, and this training has to be given in conjunction with the mental treatment in order to get the best results. In some young children, and in a very few adults vocal re-education alone suffices to effect a cure. But the vocal exercises should not be applied in a stereotyped way. Each case must be studied and exercises given that are needed in the individual case. For example some need breathing exercises most, others exercises for developing change of pitch to overcome the spasm of the vocal cords, others require articulatory exercises. The routine treatment of stuttering always produces poor results.

The most important work of the clinic, however, is not treating adults with vocal or speech disorders, but consists of training teachers for corrective speech work, who may go out into the schools of the state. People with speech disorders should receive training for their trouble while they are young. What can be accomplished by a well trained teacher is shown by these facts taken from the last June's report of a teacher who is engaged in this work. In the two schools in which she taught there were three thousand children, five per cent. of whom had some vocal or speech disorder. There were twenty-nine children who stuttered. After a year's treatment sixteen were reported normal. These cases were not reported cured until they were able to speak in their homes and in their classes without hesitation. Six were much improved, and only seven showed slight improvement. These results are not above the average. If taken early fifty per cent. or more of the cases of stuttering may be cured, and another twenty-five per cent. may be decidedly benefited. Even better results may be obtained in the other speech disorders. The great handicap in inducing schools to undertake this work is lack of knowledge among teachers and even among physicians concerning the matter. The belief that stuttering will be outgrown is widespread. It is true that a certain number of cases will get well through their own efforts at adjustment. But the

process of self cure is long and painful and can be much shortened by proper treatment and many cases will be unable to rid themselves of the defect without help.

Stuttering often causes an actual backwardness in school from one to three years. In other cases the child is able to keep up with his classes but at such a cost of mental and physical suffering that the nervous system is affected and the child quits school a neurotic for life. It is not hard to realize how inhibition of almost every speech impulse, the ridicule of playmates, the amused or pitying attitude which the child meets outside sometimes change completely the mental disposition. Stuttering prevents the individual from entering many a line of endeavor which he would like to enter as a life work. In the lower walks of life it hinders the making of a bare living. It is a fact that immigrants who stutter are rejected as they are considered likely to become public charges.

The State of Wisconsin has already made provision for training the children with speech disorders, and now there are eight cities in the state that have teachers for this work. It has been very hard to find properly trained teachers, but the speech clinic hopes to train enough teachers to supply the demand here in Wisconsin and perhaps in other states as well. During the last year four teachers were trained in the speech correction work; during the summer session twelve teachers who graduated from the training school for teachers of the deaf registered in the teachers' course. Ten of these are now teaching in the Wisconsin schools. The course consists of practical work in diagnosing the common speech disorders that occur in children, and the treatment of them; this is supplemented by lectures concerning the development of speech in the infant, the anatomy and physiology of the speech mechanism, abnormal psychology, and psychoanalysis. A through training is given in normal and corrective phonetics.

A study of the facts brought out by the investigations of psychiatrists and neurologists are of great benefit in understanding the normal as well as the abnormal child. In studying the neurotic symptoms that occur in school children as pathological lying, kleptomania, "sullen anarchy," incorrigibility, imperative actions, morbid disinclination towards certain topics in school, it is found that they are caused by the same abnormal mental

conditions that caused the stuttering. This general cause that is found back of nearly every neurotic trait and case of stuttering is unwise repression leading to mental conflict.

It seems that it is quite possible for the speech correction teacher, if properly equipped, to deal with the child with neurotic symptoms as well as those with speech disorders. This will require teachers of tact, experience and poise. The best results will be obtained where the teacher is supervised by a physician who is a specialist in this line, and children with severe symptoms should be referred to him. But there are many cases that the teacher can deal with alone. The physician for example has no time to treat a case of "sullen anarchy," or anxiousness or lack of concentration. Teachers trained for this work can accomplish a great deal of good in our schools, and can save many children from life-long suffering and failure.

ADDITIVE SUBTRACTION AND MULTIPLICATIVE DIVISION TESTED[1]

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Practice and Theory

If the Arabic numerals one to nine be arranged for addition in all their possible relations, forty-five combinations will result. These are commonly known in our primary arithmetic work as the forty-five addition combinations. Also, if we arrange the number tables in subtraction in all their possible relations up to eighteen, (including 0) we will have one hundred such relations. The multiplication and division tables, through nine, number ninety combinations each. Practically all of our teaching in the past has been toward the forming of as many separate number habit connections as a mastery of the separate tables made necessary. The operations were usually taught through new connections instead of old. Each table was taught by methods which did not allow of a utilization of previous mental connections. If, as pupils were becoming familiar with such combinations as "three and two are five" (or two and three are five), they were learning to subtract by such methods as "two from five leaves three," or "five less two is three," as many as one hundred forty-five separate mental bonds were being formed.

In the days of discipline psychology the time and effort were thought to be well spent, for a "general mental strength" was the result. Present day educational psychology seriously questions this general disciplinary theory. Many research studies lead the present day educator to the conclusion that general strength or "transfer" takes place only when we employ common or "identical elements" of material or method. The idea of general mental connections has given way to the separate neurone

[1]Delivered before Section L of the American Association for the Advancement of Science, Ohio State University, December 29th, 1915.

connection theory wherein each mental bond formed between stimulus and response calls for its particular synapse unless elements in common with previous connections are employed. An example of where a common element of material might function in different situations would be the learning of such words as "light," "night," etc., after a mastery of the stem phonogram "ight." To quote Ladd and Woodworth, *Elements of Physiological Psychology*, page 566: "In order for a transference of skill to occur from one performance to another, there should be, between the two, not simply likeness in the abstract, but some concrete part-performance in common, as there is between saying 'boot and book.'" An example of identical elements in method or process would be the finding of the difference between five and three by adding to three the number which makes five. This Thorndike would call, "identity of procedure." (*Educational Psychology, Briefer Course*, page 277.)

In this day of conservation of mental, as well as physical energy, the question arises: Of what good is it to teach one hundred forty-five addition and subtraction habits to perform two of the four fundamental processes if it be possible for us to make the forty-five combination habits do the work in both of these processes? And again, why teach a new set of division table habits if by using ninety multiplication connections pupils are able to do both multiplication and division through the nines? "To learn two forms for one thing, is a waste. Hence there is an increasing disposition both in general practice and among the more critical to utilize a single form in as many places as possible. Subtracting by adding is merely using the same association and word form for both addition and subtraction. Hence only one set of tables, instead of two, has to be learned. Dividing by multiplying is an analogous situation, though not so much employed in American schools as 'subtracting by adding'."[2]

This theory has been accepted by some of our recent texts and method books in arithmetic. Others have made mention of it, leaving it to the judgment of the teacher whether the new, additive or "making change" method should be employed in teaching subtraction, and whether pupils should be taught to divide by utilizing their previously formed multiplication bonds. That adults do in fact practise this method, in the case of sub-

[2] H. SUZZALLO. *The Teaching of Primary Arithmetic*, page 86.

traction, can be seen any day with the sales clerk or cashier. "The fact that in so many instances additive subtraction has been adopted unintentionally, seems to indicate that it is decidedly easier for the mind, and might well be taught in the schools."[3] This method for subtraction dates back to Italy and the sixteenth century and is sometimes known as the "Austrian" method. "The efforts made to adopt it in the Austrian schools, and the consequent notice taken of it in Germany, have been the cause of its most inappropriate geographical name."[4]

The advocates of this new "subtracting by adding," rather than by the old "taking from" or "borrowing" method claim for the plan two decided advantages: (1) "it avoids the necessity of learning separate tables for addition and subtraction; and (2) it increases speed and accuracy in addition, as subtraction forms are immediately converted into addition associations."[5] But while the faith of the bolder and more progressive spirits in education—and it is through them that progress is made—has been expressed for some years past in the method above described, the theory is not yet proved by actual tests. There is nothing as yet in print on this subject other than opinion based upon a most plausible psychological theory. "The only thing for the school to do, then, is to teach the method that will prove in the long run to be the most rapid and accurate, and this seems *a priori* to be the Austrian, although a scientific investigation of the matter, on sufficient data, is desirable." (Smith, *ibid.*) What then do school children actually do with additive subtraction and multiplicative division when tested over a series of months?

Nature of Tests and Manner of Giving

With a view of evaluating the above theory, a four months' controlled test in additive subtraction was given to a second grade of the Garfield Public School of Cincinnati.[6] Another second grade was taught by the old "taking from" or "less" method. One third grade was taught for four months by the multiplicative method of division. Another third grade divided

[3] Young. *The Teaching of Mathematics*, page 235.
[4] Smith. *The Teaching of Arithmetic*, page 46, Teachers College.
[5] Brown and Coffman. *How to Teach Arithmetic*, page 160.
[6] Acknowledgements for help in giving these tests are due to: Miss Winifred Humphrey, Miss Augusta Duerr, and Miss Dora W. Lyon of the Garfield School.

by learning the "division tables." In the school selected all the children who were studying German were placed in one class of the grade, and all who were studying English only, in another. There was, therefore, no attempt at selecting the brighter ones for one class, nor was there any reason to suppose that one class was of greater ability than another. In order to settle the question positively a preliminary test to establish initial ability was given. The teacher of the German second Grade, which will be called hereafter the "take away" group, or class, was asked to confine her teaching of subtraction to the following sample formula: $\frac{8}{-2}{6}$; the child always thinking the problem out as "eight less, or take away, two leaves six." All the one hundred combinations were to be learned in the same way, and all drill during the experiment was to be done according to what, for lack of a better term, was called the "take away" method. Any attempt on the part of the children to associate the corresponding addition combination was to be discouraged. The teacher of the English second Grade, which will be called hereafter the "additive" group, or class, was asked to teach subtraction as the natural complement of addition and inseparably connected with it. Her pupils, in answer to the question, "$\frac{8}{-2}{6}$, two and what make eight?" repeated the formula, "two and six make eight." The children were told that the subtraction sign meant "less" or "take away." They subtracted, however, only by adding. The pupils were frequently called upon to repeat the wording of the formula which was being followed by their group so that they might become habituated in it.

The same arrangements were made in the third grade, the teacher of the class studying German confining herself, in the teaching of division, to the "into" division method, and the following sample formula: $5)\frac{4}{20}$, five into twenty goes four times evenly. The English multiplicative division class said: "$5)\frac{4}{20}$, five times what are twenty? Five times four are twenty." The work of the third grade does not go beyond multiplication and division by five, so that only fifty combinations out of the ninety were used.

The four classes began their new work at the same time, about the first of February. The two second and two third grade classes

spent exactly the same amount of time, thirty minutes daily, in this formal work in arithmetic. As far as could be done, every difficulty that would make final comparisons impracticable was eliminated; there remained of course the possible differences of teachers in ability.

In order to determine the relative initial abilities of the four classes, a test in the addition combinations was given to all four classes before starting on the new work of subtraction and division. The manner of giving this preliminary test was exactly like that of all subsequent tests, except that the subject matter of the later practice tests was subtraction for the second, and division for the third grades. In the preliminary test, the forty-five addition combinations were printed on sheets of paper and arranged in sets of five, all sets, as nearly as possible of equal difficulty (after Courtis) in order that a child's progress might be steady, and that the one who solved thirty combinations might fairly be said to have made a score just twice that of the child who solved only fifteen. To eliminate differences in the giving of the tests, one teacher gave all of them, using exactly the same instructions for each class. Each child was given a paper turned face downward on his desk. The nature of the test was explained and the fact impressed upon the children that it was a race, each child with himself as well as with the others. At the signal all turned the papers over and worked for one minute, stopping at the signal. All the papers were collected, marked by the same person, and the scores of the individual children read to them, together with the combinations missed, in order that the child might master those before the giving of the test a month later. It was found best not to give the class scores to the teachers. Table I shows the results in medians, and probabe errors. Figures I and II picture the table graphically.

TABLE I

	Take Away Subtraction		Additive Subtraction		Into Division		Multiplicative Division	
	Med.	P. E.	Med.	P. E.	Med.	P. E.	Med.	P. E.
Addition Test								
Feb. 9	6.7	3.5	7.7	3.6	19.0	6.4	17.2	4.1
March 9	6.5	3.1	8.5	2.6				
April 6	13.4	2.7	13.6	3.3	13.0	3.5	15.0	2.8
May 4	13.4	3.3	14.7	3.6	16.0	2.2	18.6	3.2
June 1	16.2	3.5	12.7	4.5	20.0	4.4	21.5	4.5
June 17	15.4	3.2	15.7	2.5	23.0	2.6	25.5	2.5
June 17					18.5	6.1	16.0	3.5

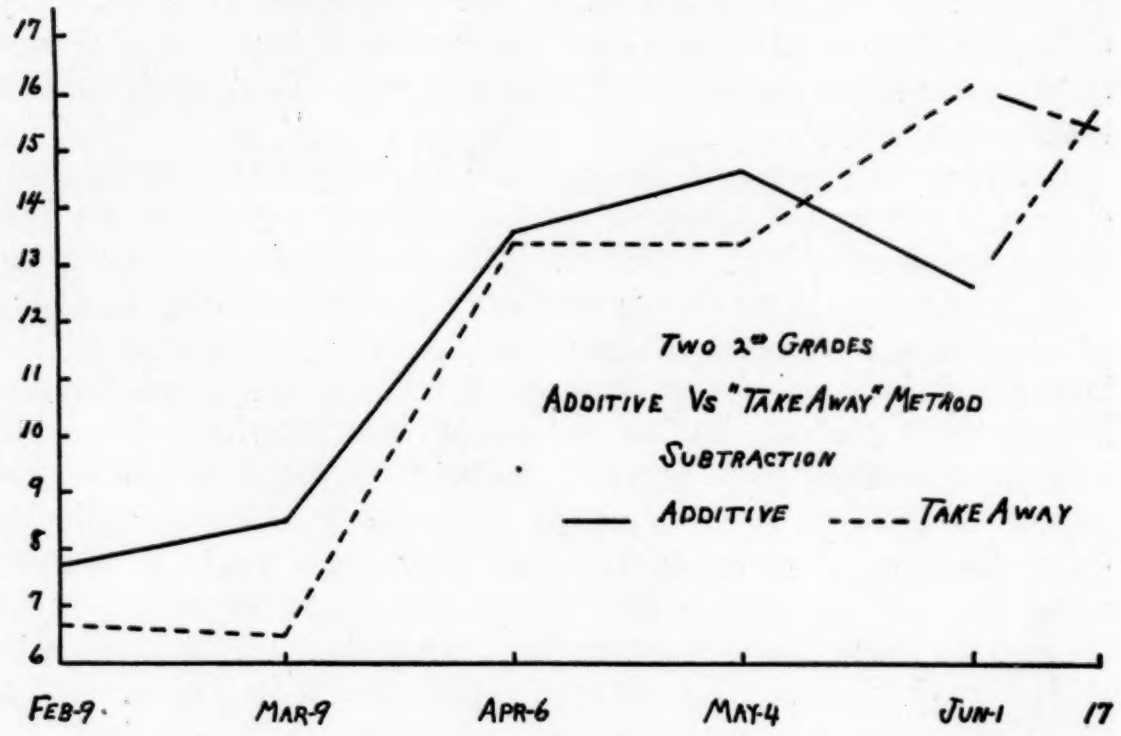


FIGURE I

Irregular lines at end represent transfer of ability to abstract examples of three figures.

INTERPRETATION OF RESULTS

The class which took up subtraction by the "take away" method showed an initial ability in addition of 6.7 combinations solved in one minute; the additive method class 7.7; the "into" method division class 19; and the muliplicative method division class 17.2. If one method is just as effective as the other, at the end of the experiment in June the additive class should stand about one point higher than the take away group, while the multiplicative division class should be about 1.8 below the other division group. Throughout the experiment median scores were used.

The March test could be given to the subtraction classes alone as the division classes had not mastered enough division combinations. This accounts for the break on the chart in the division line for March. The "take away" subtraction class showed a score of 6.5; the additive class 8.5. The former class had taken up a new process and might be expected to show a loss of ability. The additive class, taking subtraction as a mere matter of addition, had made a distinct gain in the month's drill.

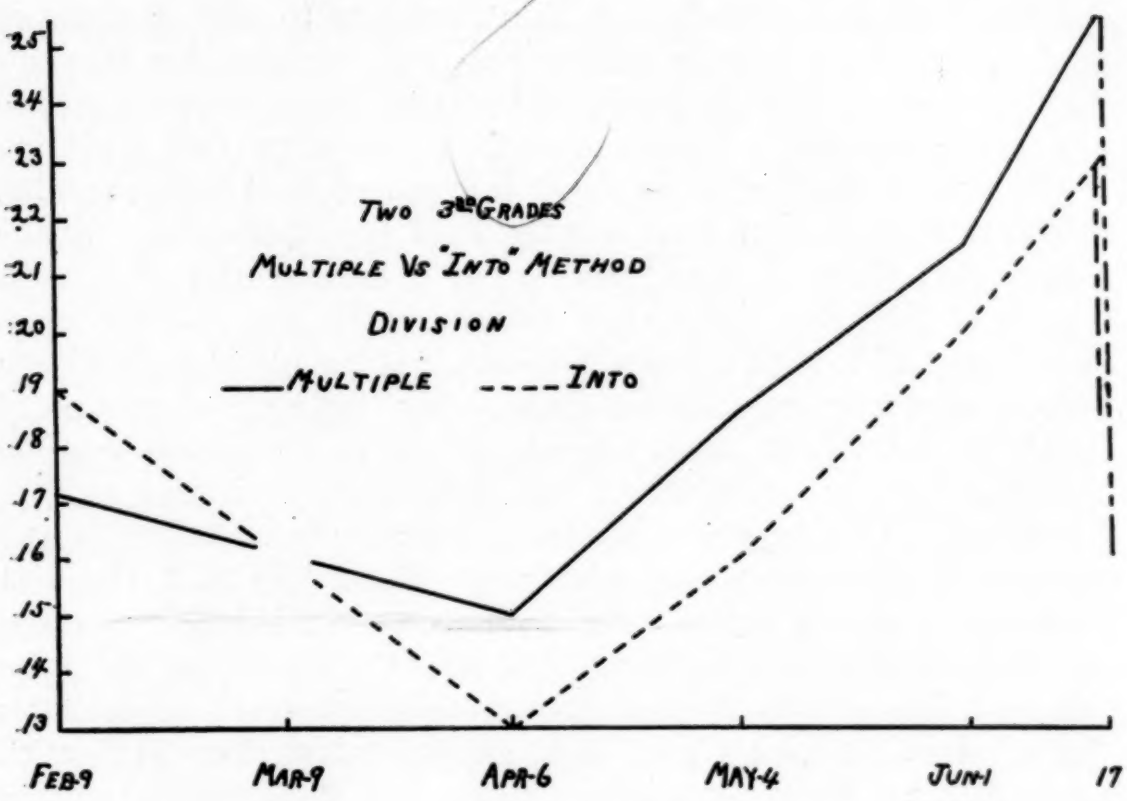


FIGURE II

Irregular lines at end represent transfer of ability to abstract examples of four figures.

The April test was given to both grades, the "take away" class showing a score of 13.4; the other group 13.6. The results in the subtraction classes were rather disconcerting. From the standpoint of actual scores, the "take away" class had almost caught up with the additive, but considering the one point difference in initial ability, it had surpassed the additive by .8 of a point. The two division classes were making their first score since the test for initial ability. With the taking up of a new process each showed a loss, that of the "into" class being much greater.

The May test showed the following scores: "take away" class, 13.4, with no change for the month's work; additive class 14.7, a gain of 1.1 points; "into" division class 16, a gain of 3 points; multiplicative division class 18.6, an absolute gain of 3.6, or a relative gain of .6 points over the "into" class. During the month of May the subtraction classes spent ten minutes each day on addition drill, pure and simple, and the two division classes the same on multiplication drill separate from their subtraction and

division work respectively. A gain in ability to add or multiply ought to show a gain in subtraction and division for the new method classes, while it would presumably have no effect on the old method classes. That the addition work proved confusing to the second grade additive pupils is apparent in the June results.

The test the first of June was the final one of the series for the subtraction classes. The "take away" class scored 16.2, with a gain of 2.8 over the month before, while the additive class scored only 12.7, with a loss of 2 points. If the methods had been equally effective the additive class should have stood one point above the take away class, while in reality its final score was 3.5 points below, or, considering the difference in initial ability, 4.5 below. The figures apparently pointed to a defect in the manner of presenting the additive method. In fact the test papers each month had revealed a weakness which will be pointed out later, this weakness being especially noticeable in the June papers. The scores of the division classes stood as follows; "into" class 20, with a gain of 4; multiplicative class 21.5, with a gain of 2.9.

The last test of the division series had to be given June 17th. At this time the "into" class scored 23, and the multiplicative class 25.5 or 2.5 higher than the former. The preliminary test had placed the initial ability of the multiplicative class 1.8 below the other. Apparently the multiplicative method of division had resulted in a gain of 4.3 over the old way of teaching, and 4.3 is a difference worth taking into account.

One point, however, had not yet been covered in the experiment. The tests had evaluated ability in the separate combinations only. Every teacher of arithmetic is only too familiar with the type of child that knows the separate combinations perfectly, but cannot work longer examples. Would the class taught by the old method in subtraction, the class that could make a score 4.5 higher in table combinations than the new method class, or the new method class in division with a score 4.3 higher than the old, show an equal ability in working the longer examples of the grade? In other words, would ability in separate combinations transfer to longer examples?

To answer this point, a one minute test was devised, consisting of abstract three figure subtraction examples for the subtraction classes, and four figure division examples for the division classes.

The examples were based on the work of the grade, used all the combinations once, and, as far as possible, they were of equal difficulty for the reason given in the other tests. The test was conducted in exactly the same way as the preceding ones. The scoring was on the same basis. The results were as follows: "Take away" subtraction class 15.4; additive class 15.7, showing practically no difference between the two classes in ability to work the longer examples of the grade even when the one point initial difference was considered. The "into" division class scored 18.5; multiplicative class 16, with a difference of 2.5, which in itself is worth consideration, but when reduced to .7 when the initial difference of 1.8 is deducted, is hardly worth taking into account.

Conclusions

Subtraction Classes

"Take away" class: 4.5 above additive in ability in separate combinations. (1 point difference in initial ability allowed for.)
"Take away" class: .7 above additive in ability in the longer examples.

Division Classes

Multiplicative class: 4.3 above "into" class in ability in combinations. (1.8 point difference in initial ability allowed for.)
"Into" class: .7 above new in ability in the longer examples.

In the case of the subtraction classes, these figures seem to point to a preference for the old method. In spite of the fact that the "take away" class had one hundred new number habits to learn, its final score in the separate combinations, and in the longer examples (initial difference allowed for) was higher than the additive method class. The papers of the children revealed the reason for the apparent failure of the additive method of subtracting. The habit of adding is stronger than that of the other three processes. Courtis recognized this when, in his tests in the four fundamentals, he placed the addition test last. The papers of the additive class showed over and over again a confusion of the two processes, a slipping back into the habit of adding the lower figure to the top one. The "take away" class showed almost no confusion in this. Evidently, if a pupil is to learn to make the reduction called for when the answer is to be smaller

than the top figure, he should learn the reduction as a process apart from special drill in addition. If he is to solve his subtraction examples reliably, he should be taught by some method to keep the two processes distinctly apart.

In the case of the division classes there seems to be a preference for the multiplicative method of teaching division. The reason probably lies in the nature of the two processes, multiplication and division. The child does not have the same tendency to confuse the two as is apparent in addition and subtraction. If he has used either at all outside of school, he has probably used one as much as the other. The very placing of the figures in the written forms suggests different processes. The forms $\underline{+2}^{8}$ and $\underline{-2}^{8}$ suggest little difference, while there could hardly be a confusion as to what to do when the child meets the situations $\underline{\times 5}^{4}$ and $\overline{5)20}$. He knows in this latter situation that five times twenty is not familiar, and that the real question is, "five times what are twenty?" There is not the same possible confusion, then, in teaching division by the shortened multipication process as there may be in teaching subtraction by addition. All of this, however, may not be so much a criticism of the method itself as a question of the manner of administering the method.

The final test in longer examples seems to indicate that ability to solve the separate tables has little relation to ability to work the examples, for the additive subtraction class with a low final score in combinations surpassed the "take away" subtraction class in ability to work the examples, while the multiplicative division class, with a high score in combinations fell much below the old method division class in ability to work the examples, all of which raises the question, Is it worth while to teach the separate tables as such at all?

COMPARISON OF THE WORK DONE IN THE SUCCESSIVE MINUTES OF A TEN MINUTE PRACTICE PERIOD IN THE FUNDAMENTALS OF ARITHMETIC[1]

FRANK M. PHILLIPS

State University of Iowa

Communicated by Irving King

This investigation was undertaken to determine how far the results of a one minute test in the fundamentals of arithmetic are a fair measure of the pupil's ability in this line and how far the results of a more extended test may be expected to vary from the results of the first minute. This general question resolves itself into the following more specific problems, on each one of which the investigation throws some light: (a) What is the relation of the amount of work done during the first minute, to that accomplished during each succeeding minute of a ten minute practice? (b) How do the results of each minute of practice compare as to variability? (c) What differences appear in the different grades? (d) What is the amount of error for each minute of work, in each grade and in each fundamental? (e) What sex differences appear? (f) To what extent may the ability of a pupil be determined by what he does in a one minute test in the fundamentals or in the first minute of a test covering more time than one minute?

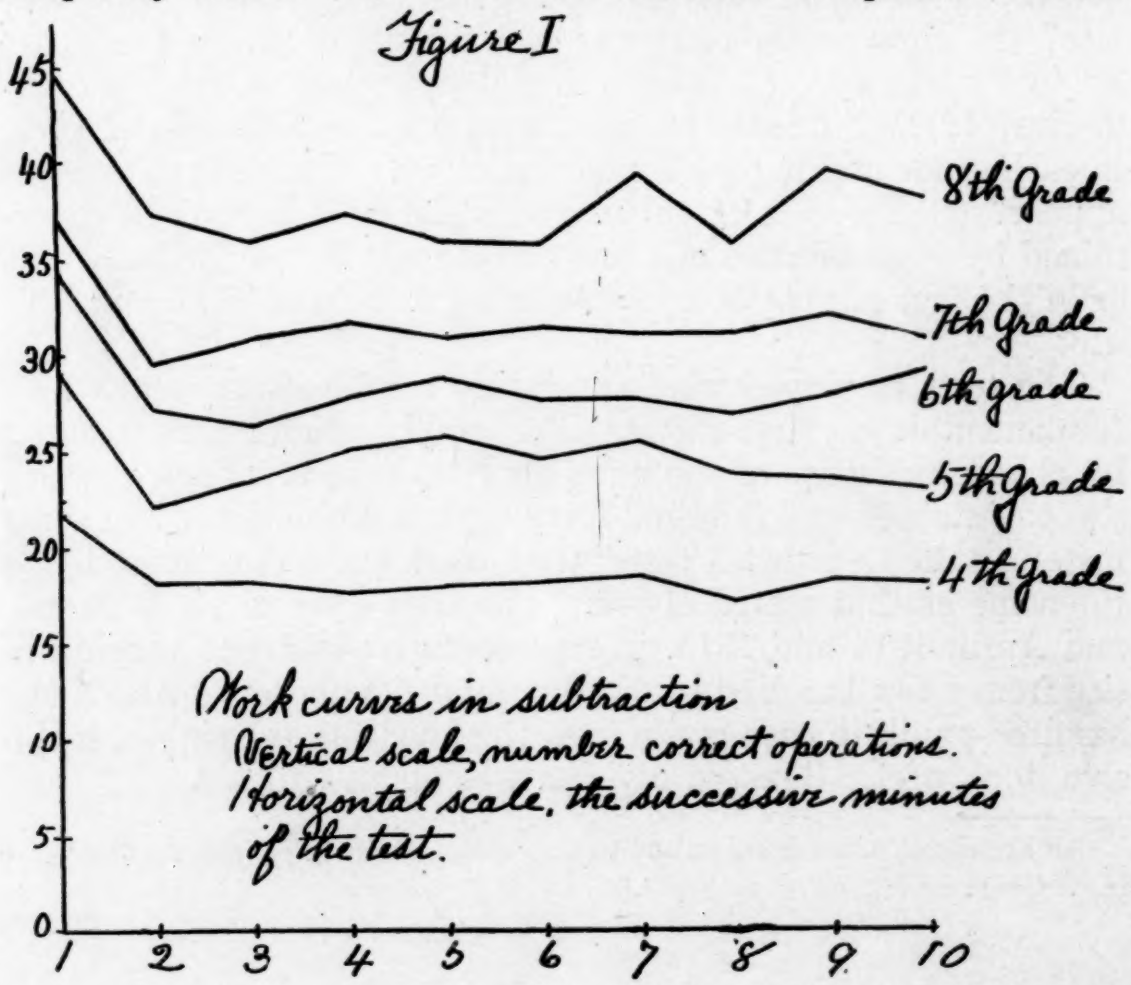
The tests employed were two figure combinations in the four fundamentals of Arithmetic. The combinations were secured by chance drawings of the numbers from 0 to 9. Each practice sheet contained two hundred forty such combinations. In some instances the Courtis "A tests" were used, the arrangement being the same as that stated above. The tests were given in March and April, 1914 and 1915, in representative districts varying in size from a few hundred to ten thousand population. About one hundred pupils in each grade from the fourth to the eighth, inclusive, took part. The sex division was about equal.

[1] An abstract of a thesis submitted to the State University of Iowa for the degree of Master of Arts.

The tests were given as follows: The pupils were supplied with plenty of the test sheets so that no time was lost in the ten minute practice period. They were told to begin at the upper left-hand corner and proceed across the page, one line at a time. They were told that during the test, the conductor would call out "one" and they were to place the figure "1" after their last operation. When "two" was called they were to write a "2" and so on. These numbers were called at the end of each minute until the tenth when they told to stop. They were asked to work as rapidly as possible at all times during the test.

A second test of the same character was given on another day soon after the first one. The results of these two tests were combined into a single set of figures and used as a basis for the computations which follow. Some 8000 test sheets were received, involving 36,820 minute scores and over one million individual operations.

The number of correct operations and the errors were tabulated for each fundamental for each minute of the test. From these, frequency tables were made and medians computed. Tables



were also made to show the average deviations and coefficients of variability for all grades in all the fundamentlas.

The median of the work accomplished in subtraction each minute of the practice is shown graphically in Figure I, divided according to grades. The work curves for the other fundamentals showing the variation in median accomplishment for successive minutes are very similar to these here shown. The medians for the first minute are higher than those of the later minutes in practically every case. They range from .21 points to 7.45 points higher than the average of the work of the other minutes, or from 6 per cent. to 21 per cent. higher than the average of all medians for the later minutes of the tests. The lowest point in the work curves occurs in the second minute in eight of the twenty curves. In the remaining curves the lowest point is after the fifth minute.[2]

The results obtained showed such surprising superiority for the first minute of the tests that the writer decided to extend the inquiry a little further on this particular point. Would the same relation of the first to the later minutes continue to obtain after several more practice periods? Five minute tests in addition and in multiplication were given daily for three weeks to sixty fourth grade and fifth grade pupils. During the latter part of the second week and the early part of the third week the first minute accomplishment was often less than that of the later minutes. The following table gives the median results for each minute of the five as found in the last test.

4th Grade Addition	37	31	33	31	31
5th Grade Addition	39	35	34	33	35
4th Grade Multiplication	26	28	23	24	26
5th Grade Multiplication	34	34	32	28	28

The above medians are somewhat higher than those obtained from the first tests. This is due to the practice effect. There is also less difference between the different minute accomplishment than in the first tests. It was also noted that the number of errors did not decrease from day to day.

VARIABILITY. The average deviations are generally a little less in the first minute than in the later parts of the tests. The difference ranges from 0 per cent. to 2 per cent. There is generally an increase in the average deviations as the grades advance.

[2] Cf. the results here reported with those of Chapman in *A Study of Initial Spurt in the Case of Addition*. This JOURNAL, Vol. VI, p. 419.

The average of all deviations in addition is 7.64, in subtraction it is 7.62, in multiplication 7.16, and in division 7.55.

The coefficients of variability, *i. e.*, the ratios of the average deviations to the medians are from 8 per cent. to 17 per cent. lower in the first minute than in the later minutes. The average of the coefficients of the different grades in addition is .219, in subtraction .271, in multiplication .266, and in division it is .269.

ERRORS. The number of attempts in each fundamental was determined and the number of errors counted. Thus the rate of error was computed for each fundamental, for each grade and for each minute of the tests. The average amount of error in the first minute in addition was .80, in the remaining minutes it was .81. In subtraction it was 1.11 and 1.26 respectively. In multiplication it was 5.32 and 5.49, and in division 2.80 and 2.34. The high rate of error in multiplication was found to be due in part to difficulty with the zero products.

As far as this investigation goes, then, it may be said that from 6 per cent. to 21 per cent. more work is done in the first minute in fundamentals in a ten minute practice than in the average of the other nine minutes and that the product is from 0 per cent. to 2 per cent. less variable, and that it contains from 0 per cent. to 11 per cent. less errors.

SEX DIFFERENCES. The work of the girls averages slightly higher than does the work of the boys. In the eighth grade alone the boys are ahead in all except multiplication and here the girls exceed the boys by only .9 of a point. The following are the average medians for all grades according to sex and fundamental.

	Add.	Sub.	Mul.	Div.
Boys	35	28	28	29
Girls	36	28.3	30	31

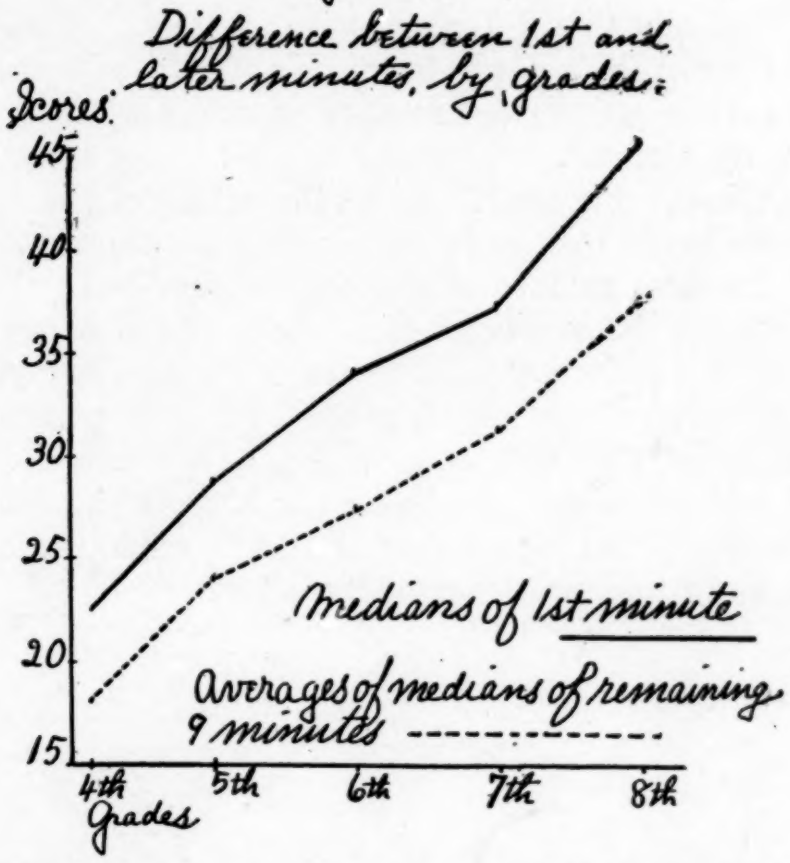
The girls' entire accomplishment is about 4 per cent. in excess of the boys. A tabulation of the errors by sexes shows that the boys made about 4 per cent. more mistakes than the girls.

The ages which were reported on the test sheets were tabulated by sexes. The fact that the girls average 3.7 per cent. younger than the boys in the same grades is of some interest.

Averages ages of boys and girls by grades.

	4th	5th	6th	7th	8th
Boys	10.1	11.0	12.4	12.9	14.2
Girls	9.8	10.8	11.6	12.6	13.9

Figure II



GRADE DIFFERENCES. In the table following are given the medians by grades for the work done in the first minute and for the average of the other nine minutes, in all fundamentals. (1) refers to the first minute and (2) to the combined results of the other nine minutes.

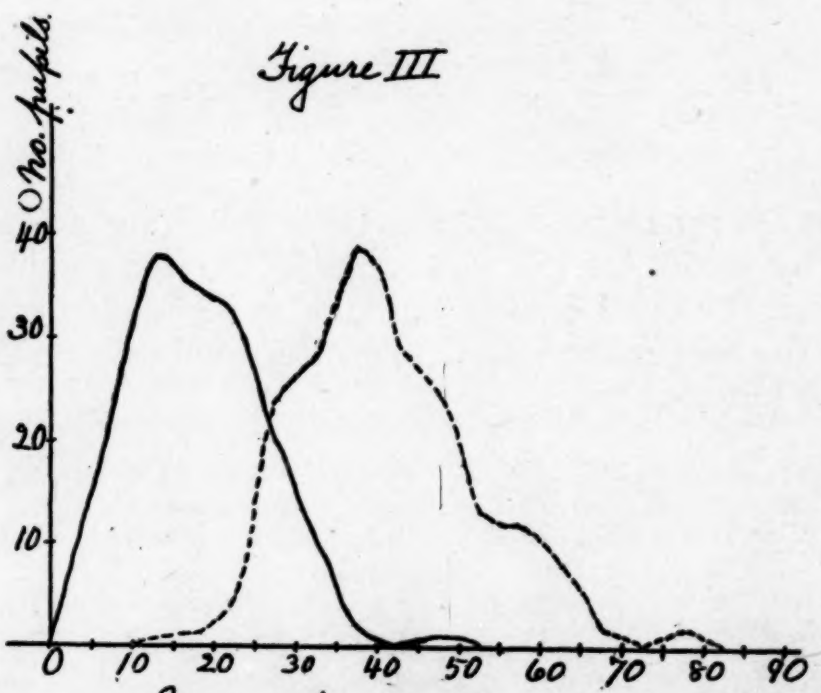
	4th	5th	6th	7th	8th
Addition					
(1)	26.7	35.1	40.5	45.8	51.7
(2)	23.2	30.2	35.6	40.1	46.3
Subtraction					
(1)	22.5	28.8	34.1	37	44.6
(2)	18	24	27.6	31.3	37.3
Multiplication					
(1)	19.8	27	31.3	33.6	38.6
(2)	17.6	24.9	30.9	31.6	36.8
Division					
(1)	18.4	26.9	33.8	36.9	42.3
(2)	14.3	25.2	32	34.5	38.9

Figure II shows this difference graphically for subtraction. It will be seen from the table that there is a considerable difference

between the work of the first minute and the average of all the remaining minutes of the test, but that in the case of the other two fundamentals this difference is much less. It will be seen, also, that the rise from grade to grade is fairly uniform. The 70 percentiles of the grade results compare favorably with the standard set up by Courtis.

OVERLAPPING. Figure III shows the extent of the overlapping of the scores made by the fourth grade with those made by the eighth in the first minute of the subtraction test. In the succeeding minutes the overlapping is about the same for both this and the other fundamentals. There is an average overlapping of 22.4 per cent. of the eighth grade with 23.6 per cent. of the fourth grade for the tests as a whole. This means that about one pupil in four might have been taken from the fourth grade and exchanged for a like number of eighth grade pupils without disturbing the grade differences given above.

Figure III



Scores of 4th grade —— and 8 grade ---- in the 1st minute of the subtraction test, showing the amount of overlapping.

CORRELATIONS. The following Pearson co-efficients of correlation were computed between the results of the first minute and the results of the last minute for all the fundamentals.

Grades	4th	5th	6th	7th	8th	Av.
Addition	71	46	39	51	60	54
Subtraction	57	59	56	67	44	57
Multiplication	66	73	72	67	58	68
Division	75	73	68	78	66	73

The probable error on account of the large number of cases is very small and it is fair to conclude that a high correlation exists between the work of the initial and final periods of a test in the fundamentals of arithmetic conducted in the manner described in the study.

CONCLUSIONS. 1. From six to twelve per cent. more work is accomplished in the first minute of a ten minute test in the fundamentals of arithmetic, than is accomplished in the average of the later minutes of the test. The high level of the first minute accomplishment is seldom reached in the later minutes. The poorest scores occur most frequently in the second minute.

2. The work of the first minute is less variable than that of the later minutes.

3. There is an almost uniform increase in the median of work done from the fourth to the eighth grade. There is much overlapping of the scores in all grades.

4. Errors are less frequent in the first minutes. The rate of errors is lowest in addition and highest in multiplication.

5. Sex differences are slight. The girls do about 4 per cent. more work than the boys, are about 4 per cent. more accurate and are about five months younger. The boys do better in the eighth grade.

6. Rather high correlations exist between the work of the various minutes.

7. From this study we may fairly conclude that the ability of a pupil in the fundamentals of arithmetic may be determined by what he accomplishes in one minute of work or in the first minute of work. The product of the first minute is a little better than that of the later minutes, a point which should be borne in mind in giving a one minute test.

COMMUNICATIONS AND DISCUSSIONS

MENTALITY TESTS: A SYMPOSIUM.

(Continued from the April number)

It is my belief that it is still premature to attempt to settle upon final scales for age ranges or upon "universal" scales. It is desirable that individuals be encouraged to continue work of this character in all possible ways. But any attempt to force a decision as to the merits of methods of scoring or as to test systems is miscalculated, particularly when the systems involved continue to show correlations of over 90 per cent.

My own interest, as an individual worker, is two fold. First, it is in seeing particular tasks and tests standardized on some graded basis, such as age, school grades or standing, occupational success, etc. (as in Roemer's study of association reactions, Sylvester's study of the form board, and your own tests of musical ability). Related to this is of course the development of graded series of tests of a single, definite, objectively describable process (as in Trabue's scales for language ability, Pintner's work with the Knox cube, Thorndike's reading scales, etc.). When we have a considerable number of such single tasks standardized, and in duplicate or triplicate sets, we may combine them as we like into sectioned or universal scales, correlate them with numerous other characteristics, and, if we dare, classify the separate scales on the basis of the mental functions which they involve.

My second interest is in seeing more work done on the practice limits of numerous tests. Present results indicate that so long as we work with initial trials we are on variable and treacherous ground. Practice limits, however, in even a few tests, seem to be significant not only of actual relative standing but also of general performance. Measures of what an individual *does* do tell us little about the reasons for his achievement, or of what to expect from him ultimately. Measures of what an individual *can* do, however, at least enable us to suspect where his difficulties or his virtues lie.

As distinguished from Professor Yerkes, I am not "eager to see the complete abandoning of all forms of" anything. If there is to be a committee, its work should consist in the encouragement of the continued inquiring use of every possible form of test or scale which anyone has the genius to formulate and the patience to standardize in a preliminary fashion.

H. L. HOLLINGWORTH.

Columbia University.

(1) The problem of intellectual diagnosis seems to present two phases—quantitative and qualitative. I think we have reached the point where we can make quantitative diagnoses. They have a large margin of error and the methods are clumsy. Much of the time, too, we are obliged to take our results on faith before we put them to actual use. That is, we lack objective proof of the correctness of our diagnosis, just as the physician lacks it before he begins his treatment. Despite these imperfections, however, I think we have a right to claim considerable advance in methods of testing *amount* of intelligence. The method involves the use of a large number of tests—just how many is not yet determined—the careful selection of tests with reference to economy, suitability for specific purposes, etc. Methods of treating data and methods of representing scores must also be further refined.

It will be noted that this quantitative measure, even in its finished form tells only how much intelligence is possessed. It is best adapted for the grading of persons in groups. In diagnosing individual cases, however, the qualitative phase is the one that is most insistent. Here the problem is to determine kind of intellectual ability, and in this regard I think we can not lay claim to much achievement. Perhaps the most satisfactory basis on which to attack this problem is that suggested by Professors Yerkes and Seashore, namely, the arrangement of groups of tests "for special functions or groups of functions." I have nothing to add to their statements on this point.

(2) I have nothing to emphasize regarding the work we are doing here except to remark that we are still at the "quantitative" stage. The work of this third year is being directed toward the more exact determination of the degree of reliability possessed by the series of tests in use. We are examining methods of treating data so as most accurately to represent the measures, and are devising methods that will make for economy in administering the tests. We have now evolved a system whereby we can test 100 subjects with a series of sixteen tests, lasting over two hours, distributed over three test-periods, and work up the results within two weeks.

(3) Regarding steps for the immediate future, I favor above all, the organization of workers into groups, and the policy within each group, of adhering closely to similar methods of procedure. This is absolutely essential to the economical development of tests and the development of norms. For example, all who are interested in the psychological examination of college students should mobilize and

agree upon a number of tests which all will use. Then various problems might be apportioned among these workers. For example, one laboratory might be given the task of trying out several forms of a test for the purpose of determining which form is best; to another might be assigned the task of showing how much weight should be given one test relative to the others in a series, etc. Other groups might well be formed for the standardization of tests in other fields.

HARRY D. KITSON.

University of Chicago.

The following represents my present views and plans on the questions indicated, most of which may be found in greater detail in various articles in the *Journal of Psycho-Asthenics* since 1910.

(1) The Binet-Simon tests offer the best means in existence of determining grades of mental development. Each of the several revisions that have appeared in America is an improvement over the original. None is entirely satisfactory because various improvements are still desirable and possible.

(2) Psychologists should keep in mind more than some are doing at present the distinction between the ideal of maximum scientific accuracy and practical usefulness. The present danger to the future of psychology in this field lies much more in the psychologist's hostile attitude and destructive criticism of the Binet-Simon tests, which are admitedly imperfect, than it does in the errors in mental diagnosis resulting from their use, even when employed by relatively untrained examiners.

(3) Psychologists interested in the work of devising and adapting systems of mental tests should not attempt any without several years of preliminary work in this particular field. An extensive first-hand knowledge of children of all ages is also essential. The history of the Binet-Simon tests themselves has proved this, and stands in danger of repeating itself.

(4) The present chief needs for future progress are (a) a better understanding of the Binet-Simon tests and underlying principles, with a better appreciation of their value and accuracy as they stand, as compared with other methods; and (b) a more ready acceptance on the part of those engaged in test-making of the contributions of co-workers. Progress should be along the line of revision and extension of the old system, following its general plan and underlying principles.

(5) The appointment of a committee to decide on the best form of Binet-Simon tests, or to devise a new system would not be to the best interest of progress. The problem is too large for a committee. It is one on which we can expect constant progress, but never a final solution, any more than we expect the completion of a science. The work of any specially appointed committee would stand in danger of carrying an air of authority and finality beyond its merits, and of discouraging further individual efforts. The existence of several different revisions, or new systems of tests, is not in itself objectionable, or incompatible with accuracy. The field should be kept entirely open, and we should let the test of time decide what shall survive. The present uneasiness, so far as any exists, concerning the value and future of the Binet-Simon tests comes much more from over-ambitious psychologists anxious to offer something better than it does from any failure of the tests themselves in their practical application.

(6) The present status of my own work and plans is as follows: I hope shortly to summarize my results in two volumes, probably under the general title of "Measurement of mental development." One part will be on "General principles." Several chapters of this have been in manuscript form for about a year, when circumstances prevented my completing it. The second part will be a "Manual of tests," comprising essentially a further revision and extension of the Binet-Simon system. I have been engaged for about six years in devising a group of tests that would extend the Binet-Simon system on the upper end so as to include all ages, keeping in mind certain essentials and desiderata that appeared in the daily examination of defective and normal children and adults. Further, the tests and method of scoring in the upper part of the new system will be changed so as to make the scale unlimited in the score that may be attained. Additional tests will also be added to each age-group above two years, increasing the number probably to eight for each age group, and a new group for the age of eighteen months will be inserted.

(7) The arrangement of the Binet-Simon tests in age-groups is convenient, but not an essential part of the system. It would make no material difference to number them consecutively from first to last and express the norms for them in terms of the average total number of tests the children of each age pass, as is done in Yerkes' "Point Scale." Expressing the results in terms of mental ages and "Intelligence quotients" is one of the most valuable contributions yet made and should be adhered to.

(8) The "Point Scale" plan of allowing part credits for different degrees of performance in a test is, I believe, wrong in principle when applied to all tests indiscriminately, and especially for younger children. The best manner of scoring in any case can be determined only by a careful study and analysis of the individual test in question and the mental traits of the age for which it is to be used. The success of many of the Binet-Simon tests is due largely to the fact that several trials are allowed and partial failures not counted. The aim for any test should, in general, be to determine whether the child is capable of performing the kind of task set. One success proves his ability, while failure in one or more trials may only indicate poor effort or other hidden subjective factors peculiar to the individual child, or unknown objective factors peculiar to the trial. The manner of scoring best and necessary for older children and adults may be poorest for younger children.

(9) The general character of the tests, as well as the general mode of procedure in giving them, must differ radically for different ages. I have for several years been teaching the following to my classes: Division into age-periods 0 to 2 yrs.; 3 to 10 or 12 yrs.; and 10 or 12 yrs. to 20 yrs. or more. The inapplicability of tests for the first age-period to later ones is obvious. But I believe that the general readjustments required from the second to the third period are almost as extensive. On the other hand, one continuous system of tests for all ages is desirable and possible. Three independent scales or systems would cause difficulties for the ages near the dividing points between age-periods.

F. KUHLMANN.

Faribault, Minn.

From a study of the significance of mental measurements, arising especially from my attempt to understand the relation of deficiency to delinquency, I have come to the conclusion that the psychologists need a revival. In particular we need to reconsider the principles upon which a scale of mental development should be formulated. I therefore welcome this renewal of the discussion about measurement methods.

As evidence of the confusion in our notions about scales, we may contrast the statements of Cyril Burt and Karl Pearson. Burt is quoted as saying:

> "Except for rough and popular purposes, any measurement of mental capacity in terms of age is unsatisfactory. Who would measure height and weight in terms of years?"

To which Pearson replies:

> " . . . a year's growth is an absolutely valid and scientific unit, when determined on a big sample, of either head-growth or stature-growth. There is no valid reason to suppose that a year's growth in mental power may not be taken, for all practical purposes, to mean the same unit from ages 6 to 15. . ."[1]

This disagreement may have arisen from the faulty and irregular norms for the different ages with the Binet tests. Even if age units were proper during the period of development, it is not easy to find a simple method of stating the change in the conditions at maturity. It is to be noted that the question of age units is independent of the question of arranging the tests in age groups.

The development of a point scale using some tests similar to those of Binet would undoubtedly be an advantage if the tests were weighted empirically. Even when the tests are given different weight in points on the opinion of the investigator, as by Yerkes and Bridges, it is probably some improvement over arbitrarily regarding them all equal, as did Binet. Instead of including some tests which can not be scored for all degrees of accuracy, I should prefer to choose tests, the results with each of which could be scored with continuous units. The problem would then be to build a scale out of such tests. When this is done I believe it will be a great advance over our present scales.

The question whether retardation should be expressed in terms of years, mental quotients, proportion of average scores, or percentile deviations suggests a difficult problem. There is little question but that retardation in terms of years has a definite and important significance to the public. It should probably, therefore, be retained and supplemented by other statistical statements as to the extent of the deviation from the central tendency for the chronological age. On any scale the average score for approximately random groups should be indicated for each age, with the various points of deviation. For *developmental* scales the percentile distribution seems to be best because its significance is more independent of the form of distribution, skewed or normal, so long as one wishes to compare corresponding positions at different ages. It seems to me that this should

[1] *Questions of the Day and of the Fray*, 1914, ix, p. 36.

become a fundamental principle in constructing developmental scales. I should, therefore, prefer to express acceleration, retardation, and deficiency in terms of percentiles for the age.

In this connection, why should we not substitute the simpler German term, "life-age" for the cumbersome "chronological age"? Neither custom nor a possibly clearer meaning seems to me sufficient advantage here for holding on to a term which wastes so much time and space, unless that term is very dear to the hearts of my countrymen.

When we have planned a satisfactory scale for general intellectual ability, we should then devote our attention to a conative scale, a scale for emotions, scales to detect special abilities, etc.

Until we have better planned systems of measurement, we shall find, I believe, that developmental scale most useful which has been tried out most thoroughly with the most nearly random groups. The proper interpretation of results is a much more pressing practical problem, it seems to me, than the formulation of more tests or scales on the same lines.

J. B. MINER.

Carnegie Institute of Technology.

My interest in this field has been in the determination of the validity and usefulness of group tests. In the last few years, I have given such tests to many thousand children, and studied the results from many points of view. I am firmly convinced of the usefulness as well as the validity of the tests. A teacher can, by spending two hours in giving the tests and a few evenings in grading the papers, get a knowledge of the abilities of the different pupils that will be of great service to her, not only in the matter of classification and gradation but in the actual teaching of the children. My notion is, that mental diagnosis is of value in connection with *all* the children of the school, and not merely as a means of selecting out the deficient and supernormal. If we are to make this wider use of mental tests, group tests are a necessity, for individual examination of all the pupils is, it seems to me, impossible.

My present views as to the kinds of tests to use, the manner of administering them, and the methods of treating the results are as follows: For all the various important aspects of mental life, we need definite tests. Some of these should test a very simple function; others, a complex of functions. In some cases, the same test

can serve for all ages. In others, we need different tests for different ages. In testing logical memory, for example, I have found it advisable to use one test for the early grades, another for the intermediate grades and still another for the high school. But in the substitution test, one form will serve for all grades. In the new edition of my *Examination of School Children*, soon to be published, I have given up the idea of using the same test for all ages as unnecessary, and in some cases, undesirable.

What type of test shall we use? The answer to this question should come not from a theoretical consideration merely, but chiefly from a consideration of *usefulness*. We should use those tests and that combination of tests which, in practice, give us the best estimate or criterion of what the child can do when the various functions tested work together in actual life. In a very general way we may say these tests are such as determine learning capacity, or the rapidity with which new associations can be built up. Such a test is the substitution test. The new learning apparatus, which I demonstrated at the Chicago meeting, and which has been used in the study of several hundred white and colored children and three hundred adults, gives much promise of usefulness in this field. It enables one to test the ability of a child of any school age to build up sensory-motor coordinations, and does not involve the ability to read or any other school room skill.

After tests of learning capacity come tests of retention, *i. e.*, tests of various aspects of memory, especially of logical memory and rote memory. After tests of ability to get experience and to retain experience, come tests of the usability of experience, such as the association tests, particularly the opposites test. I have found most useful of all, the Ebbinghaus Completion test, which measures a complex of functions. But I shall not attempt here to give a complete inventory of the necessary tests. I very much doubt the practicability of emotion tests; but in the field of motor activity, I have found the tapping test quite worth while. The Binet scheme of a separate set of tests for each age is not what we want, but rather, a systematic series of tests reaching through all ages.

I take it that Yerkes' objection to age norms is to such norms based on the Binet kind of tests. And I think the objection is valid as against that kind of test, but not valid as applied to tests given to successive ages. Let us consider logical memory, for example; we can give a certain test to the primary grades, a different one to

higher grades, and still another to the high school. By equating the value of the different tests, we can establish a continuous scale. And on this scale we can readily place a child with reference to his memory development. These values could be arranged along a scale beginning with zero and proceding with equal steps. The age and sex norms could be fixed along this scale. The marks of the different kinds of tests could also be equated, so that the same numerical expression would mean the same thing when applied to any test. For example, six in logical memory would mean the same development as six in opposites or learning capacity. And it would be a further advantage if this number corresponded to the chronological age of the child. By this I mean that *six* should be the average mark made by six-year old children; seven, the average mark made by seven-year old children, and so on. It would be very easy to prepare a table for use with the tests, that would enable the examiner at a glance to transfer a child's mark in any particular test to the required scale. For example, in a set of tests, a child might have thirty in logical memory, forty in rote memory and twenty-five in opposites. By reference to a table we might find that these figures corresponded to six, six, and seven, giving an average of six and one-third. Suppose the child is nine years old. We at once see that he is retarded nearly three years. Such a scheme as this would enable us to state the child's ability as determined by adding together the results of all the tests, giving equal weight to the different tests. It also enables us to compare the child's development in different functions.

Since group tests are not applicable below the third grade of school, modifications of the same general types of test should be prepared for use in the first and second grades.

I think we ought to have a national commission acting under the American Psychological Association, to prepare each year a new set of tests and to establish age and sex norms for them. The tests and norms and test material should be ready by September of each year. If the test material and a manual of the tests with directions and norms should be sold at a trifle above cost, the whole scheme would be self-supporting.

W. H. Pyle.

University of Missouri.

(To be concluded in the June number)

SCHOOLS AND CLASSES FOR EXCEPTIONAL CHILDREN [1]

This is the title of one of the twenty-five sections of the report of the Educational Survey of Cleveland. It comprises seven chapters as follows: first, Provision for Exceptional Children in Cleveland; second, Why We Have Special Classes; third, The Socially Competent; fourth, The Socially Incompetent; fifth, The Selection of Feeble-Minded Children; sixth, What Should Be Done for the Feeble-Minded; seventh, Summary and Recommendations.

The present discussion will consider only that part of the report which deals with backward and feeble-minded children. This topic occupies three of the six chapters exclusive of the summary, and seventy-one out of the hundred and twenty-two pages. In the summary and recommendations, fifteen out of the thirty paragraphs relate to this subject. They are as follows:

6. "The socially incompetent, upon reaching maturity, should be permanently segregated. Their training should be given in special schools and should be for the purpose of making them partially self-supporting in institutions.

17. "The socially incompetent are those who are incapable of maintaining an independent existence. Among them are the feeble-minded.

18. "The feeble-minded are distinguished from the normal by their inability to meet the complex situations of our competitive social life.

19. "Of Cleveland's school children, over 2,000 are so far behind the majority of children of the same age and social experience that they should be examined by a psychologist to ascertain whether or not they may be trained to live without supervision or assistance.

20. "In some of the classes organized for the mentally slow there is a large proportion of feeble-minded; in others very few. Some of the feeble-minded are still in the regular grades.

21. "For most of these special classes liberal provision has been made, but the results obtained in the attempt to train many of the children do not justify the expenditure.

22. "Children in the classes for defectives are given a physical examination by the physicians of the Division of Medical Inspection. Their home environment is investigated by the school nurses. The

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[1] DAVID MITCHELL. *Schools and Classes for Exceptional Children.* Survey Committee of the Cleveland Foundation, Cleveland, Ohio, 1916. Pp. 122.

mental status is determined by the use of the Binet-Simon Tests of Intelligence.

23. "The Binet-Simon Tests, while valuable as part of the mental examination, should not be the sole available ultimate criterion for determining mental status.

24. "The diagnosis of feeble-mindedness should be made by a clinical psychologist who should have the co-operation of the Division of Medical Inspection and the assistance of a trained investigator of environmental conditions.

25. "All children who have failed in two years of school work and are below the fifth grade should be examined by the psychologist. A permanent record of each examination should be kept.

26. "For school purposes the feeble-minded may be divided into three groups. To the children of the two lowest groups no academic work should be given. To the children of the highest group a limited amount of academic instruction may be given.

27. "The teachers of the feeble-minded children need not be highly trained specialists and do not need to receive greater compensation than teachers of the regular grades.

28. "The organization of all classes for the mentally defective should be under the direction of a special supervisor.

29. "The classes for the feeble-minded should be in special schools, since this arrangement allows a proper grading of the children with consequent larger classes and less expense for instruction.

30. "For the segregation of the feeble-minded when they reach maturity, an institution should be provided by the state, or the city, or by both in co-operation."

The recommendations are excellent for the most part and should be read and followed by all school officers, and all those interested in the welfare of our public schools. We question the wisdom of No. 27 so far as it relates to compensation. In the discussion leading up to these conclusions and recommendations the author has, for the most part, made a very clear statement of the situation as it is in general, and undoubtedly in this specified instance in the city of Cleveland. It is interesting to note, for example, that he finds in Cleveland 2,077 children, "approximately 3% of the school population has been in the schools three or more years longer than the grade in which they are would indicate. All of these children may be considered suspects." Experience teaches that when these suspects are carefully examined at least two-thirds of them will be found to

be feeble-minded. This would give the two per cent. which is coming to be accepted as the number of children in any school system who are feeble-minded.

A telling criticism of some of the teaching of defectives is given on page 71, where it is shown that a boy who was being trained on the spelling of the following words, "playground, usual, since, asked, dragged, himself, pretty, many, pale, unlucky, chase, precious, lived, money," could not write from dictation, "It is my bird I see."

It is perhaps unfortunate that the author has let himself be drawn into discussing phases of the problem which involve an intimate knowledge of the feeble-minded, for it is here that he shows a weakness which somewhat mars the value of an otherwise excellent report. This is particularly manifest in his discussion of the Binet Tests. Here the argument is so labored as to savor strongly of prejudice. It would almost seem that he had not been sufficiently sympathetic with the test to read carefully Binet's work, and he makes accordingly several glaring errors. He says, page 74, "In 1905 two French psychologists, Alfred Binet and Theodore Simon, published a series of tests arranged in order of increasing difficulty." Dr. Simon is not a psychologist but a physician. He is assistant physician in the Insane Asylum at Saint-Yon.

Quoting further, "The easiest test of the series should be passed by a three-year old child. For different years of age a different number of tests are provided." The 1905 test consisted of a series of thirty questions arranged in order of difficulty. There was *no attempt to divide them into years* and no statement as to what age the child should be expected to pass the various tests.

"Three years later the tests were revised. This revision was translated into English and the tests were used with American children." The 1908 measuring scale of intelligence was in no sense a revision of the 1905 list of questions, although it used some of the questions which had been suggested in the earlier article. It was a wholly new contribution and was really the first appearance of the "Scale." It is scarcely correct to say that this revision was translated into English since this article (not a revision) comprised 90 pages in the original and only a very brief condensation has ever been translated. Nor did the writer of this review revise that 1908 "revision" as the author of the report implies. Binet himself revised it in 1911, and that revision was the basis of the present writer's English version.

"A child is scored as having the mental development of the highest age for which he has succeeded in all of the tests save *one*." Apparently the author is ignorant of the fact that Binet himself changed this in 1911, making it read, "A child is scored as having the mental development of the highest age for which he has succeeded in *all the tests*." That is the formula that has appeared in all the Amercian editions since 1911.

The author's discussion becomes more and more involved and ambiguous. It is difficult to understand just what idea he wishes to convey. For example, he quotes from Dr. Clara H. Town's translation of the Binet article as follows: "For the method to have a scientific value it is absolutely necessary that the individual who uses it should have served an apprenticeship in a laboratory of pedagogy, or possess a thorough practical knowledge of psychological experimentation." "In spite of this warning these tests have been used in Cleveland and in many other cities as the ultimate criteria for classifying children according to their mental status." This seems to imply that the individual using the Binet test in Cleveland has not served an apprenticeship, nor had practical knowledge of psychological experimentation. If the reviewer is not mistaken this work is done in Cleveland by Miss Charlotte Steinbach. Miss Steinbach has "served an apprenticeship in a laboratory of pedagogy" and is thoroughly competent to give the Binet test, and to decide who is feeble-minded. What may be the situation "in many other cities" does not concern the present survey.

It is unfortunate that the author allows himself to dogmatize as freely as he does, as for example in the following: "Even if the methods of giving the test were perfected to the utmost possible degree, the results would still be unsatisfactory. This is because the Binet-Simon Tests alone do not constitute sufficiently accurate and trustworthy indicators of the intellectual abilities of many children to render them final and reliable guides for pronouncing a child feeble-minded or normal, or a moron or imbecile as the case may be." Such a statement needs to be proved, and the author offers no proof. There are thousands of cases in which the Binet tests alone are ample to decide, not only on the defectiveness of the child, but upon his grade. The author says, "As the tests are administered in Cleveland, the child who is four years retarded, and tests at ten or less, is considered feeble-minded." This is a thoroughly conservative and safe rule. Moreover, the author does not make it clear anywhere that

the Binet tests are the sole criterion for determining feeble-mindedness in the city of Cleveland. In fact he seems to say that only those children, who are suspected because they are behind grade, are referred to the psychologist, and he specifically says that there is an excellent medical examination of the children, and an investigation of their heredity. Presumably all of these facts are available and are taken into account by the Binet examiner.

But it is on page 85 that the author falls into his most serious error. He says, "Two children who do not pass higher than the test for three years are classed as low-grade imbeciles. One of them had lived sixteen years while the other had lived only six. No adequate consideration is given to the importance of the fact that one child is six and tests at three, while the other is sixteen and tests at three." The rest of this page is devoted to a discussion of "the fallacy of such a determination." The author is unfortunately ignorant of the fact, familiar to those who have studied the feeble-minded intimately, that the child who gets three years behind has, *as a rule*, stopped development and seldom progresses appreciably beyond that point. It is true that we do not yet have sufficient data to say that the child who is six and tests three will *never* test more than three. With the child who is sixteen and tests three that will be a certainty. Nevertheless, in the case of the six-year-old child it is a very high probability. In his argument the author assumes that the child is going to develop at a perfectly normal rate, and by the time he is thirty-six years old he will test thirty-three and the differences will be unnoticeable. The absurdity of such as assumption must be evident. The six-year-old child who tests three may possibly at some future time test four, or even five. The chances of his ever being above that are very slight indeed. If he tests four he is still a low-grade imbecile, if he tests five he might be called a middle-grade—a distinction of no very great importance when we remember that if the child is placed in a special class or an institution, he will be given every attention, and any increase in his intelligence will be gladly recognized.

On page 86 the author says: "In Cleveland the methods used for examining children who are suspected of being atypical are usually thorough and comprehensive in those portions preceeding the psychological testing." Now it does not seem from this that the Binet test is the only criterion used. He says: "The schedules in use provide for securing some two hundred and twenty items of informa-

tion, under thirteen heads. All of this work is unusually well done in this city. The one weak link in the chain is the method used in giving the mental tests on which the ultimate decision as to the child's mentality is based."

Again on page 89, the author makes a statement which is very misleading, if not erroneous. He says: "In a similar way the school system should have in its service an examiner competent to employ not only the Binet-Simon tests, but such other tests as, for example, the Yerkes-Bridges Point Scale, the De Sanctis Graded Tests, the Healy Tests, the Terman Puzzle Tests, the Thorndike Mechanical Tests, the Ebbinghaus Completion Tests, the Swift and Terman Interpretation Tests, and the 'Aussage' Tests, as well as tests of physical and motor capacity and those of sensory capacity." Here again, the author's unfamiliarity with feeble-minded persons leads him astray. Most of the tests he names are inapplicable to feeble-minded people, or even to children. The Yerkes-Bridges Point Scale is practically the Binet Test, as nineteen out of the twenty questions used in it are taken directly from the Binet-Simon Scale. Of the rest of the tests above mentioned not one is standardized. It is doubtful if there are six trained psychologists, such as the author likes to insist upon, in the entire United States who could give all of those tests and decide *on the basis of the results* whether or not the child was feeble-minded. In conclusion of this section of his argument the author gives an illustration of what he calls "the type of case which cannot be settled through the application of the tests of a formal and routine nature." He says: "We may cite the examination of a five-year-old child recently conducted at a psychological clinic in another city. *Several psychologists who took part in the examination were doubtful of the diagnosis.** Not one of the examiners was ready to say whether the child was or was not feeble-minded. Several months later the child was brought back for further examination. For three-quarters of an hour the clinician did practically nothing but roll a ball across a table to touch the hand of the child. At the end of that time a slight response was noted. The hands of the child began to move and the ball was returned part way across the table. Shortly afterward the child was picking up the ball and throwing it much as would a normal child. The diagnosis, at the conclusion of the investigation, which included all fields from which

* Italics ours.

additional information could be procured, was 'normal mentality—apparently quite deaf.' A period of training by an expert teacher of the deaf confirmed the diagnosis." It is to be regretted that the author fails to tell us just what this illustrates. Left to himself the writer is compelled to conclude that "several psychologists" took two periods (one of these of three-quarters of an hour in length) separated by several months, to find out that they were dealing with a *deaf child* and not with a feeble-minded one. It is not at all impossible that the Binet specialist might have discovered this fact at the first sitting in a half-hour or less.

The present writer has gone into this matter in some detail, because reports of this character tend to confuse school authorities and encourage their inertia in regard to the defectives in their schools. Whatever opinions one may hold about the Binet scale, it cannot be denied that its advent has done more to rouse the public to the prevalence of feeble-mindedness, and the menace that it is to our social organization, than anything that has ever happened. If the author's point is that the Binet scale does not pick out enough of the defectives, why does he not say so? His implications are that a great many mistakes have probably been made through the use of this instrument. As a matter of fact, there have been picked out of the public schools of Cleveland 1647 feeble-minded children, the great majority of whom would not yet have been discovered, or for some years to come, had it not been for the Binet Scale. Why not say: "This is good, but we want to do better. The Binet Scale left out some who are feeble-minded, we ought to find them also." Upon this we could all agree. It is highly probable that not only those who test ten or under and are four years behind their ages, are feeble-minded, but that a large proportion of those who are only three years behind, perhaps even only two, are also feeble-minded. We need methods of detecting these also, but as yet no method has been devised.

Aside from these few faults, the report is an excellent one.

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ABSTRACTS AND REVIEWS

RICHARD L. SANDWICK. *How to Study and What to Study.* New York: D. C. Heath & Co., 1915. Pp. 170.

The first part of the book is a simple presentation to "younger students" of a number of "principles of effective study." On the whole this part ought to be of rare value to students about to enter high school or even to those in the eighth grade. However, a few assertions of "principles" seem pernicious. Chapter VI is a blot on the book: "Study aloud or with lips moving, in order (1) to strengthen attention and hold the mind upon the work in hand, and (2) to strengthen the memory by providing more mediums for recall." (Page 41.) This does not accord with the writer's foreword: "As I have kept pace with the slowly developing literature of educational psychology." Modern literature on the higher thought process, on silent reading, etc., even in their slowness have outrun this ardent advocate of studying aloud. In the light of the increase in school study and relative decrease in home work perhaps most pedagogues would prefer not to borrow China's scheme of study.

The second half of the book on *What to Study and How* aims to guide in "a reasonable choice of studies, or strengthen your purpose when a choice has already been made." If the author is taken at his word a majority of high school students may feel obliged to study Latin in order to "increase the power to read and understand English," to spell, and "to appreciate the civilization of the Roman peoples." Some of these students, especially if they get no farther than the high school, may discover that they have chosen a long and rugged road to Rome unless they "trot" with "free translations."

The author maintains that to study history is to induce right personal conduct since good and bad get their due rewards. The "persistent Washington . . . wrings victory from defeat." "The cruel tyrant . . . falls by the avenger's knife." The student that sets out to find these statements true soon would be hopelessly confused by contradictions. History is replete with evidence that the villain does not always get his dues nor the benefactor his reward. Rather, as most texts fail to show, individual conduct of the monarch or the slave earns a reward which is paid to and by succeeding social

generations. The author ignores a still better reason for studying history, namely, to nullify human prejudices and to foster human brotherhood. Designed for adolescents who respond rather readily to appeals for social service, this book unduly emphasizes the bread-and-butter end of learning.

In spite of other obvious defects there are so many good things in this concise, attractive, clearly-written, well-bound little volume that it could be used with profit as a text from which high school pupils could be given some specific directions in the art of study. It should be of special value to the teacher.

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CALVIN N. KENDALL AND GEORGE A. MIRICK. *How to Teach the Fundamental Subjects.* Boston: Houghton Mifflin Co., 1915. Pp. ix, 329. $1.50.

The term "fundamentals" in education, which originally had reference to the formal subjects only, has come to have less and less significance as some of the older content subjects have gradually found their way into this favored group.

In their discussion in this book, the authors have not only treated as "fundamentals" the formal subjects of English (which includes reading, common speech, composition, grammar, spelling, and penmanship) and mathematics, but to these have added history, geography, and civics, and then, as if to destroy the usefulness of the term "fundamentals" entirely, have devoted one of their best chapters to the subject of teaching hygiene. Not the anatomical, text-book kind of two decades ago, but the kind which leaves the child with such definite ideas and habits as will make a difference in his own health, and in the health of the community. Such an inclusive use of the term "fundamentals" should help in breaking down in school practice, the traditional barrier between the formal on the one hand, and the concrete and useful on the other.

The book is divided into five chapters: The point of view; English; mathematics; geography, history, civics; and hygiene; and no one of the topics has been given an undue amount of space. It is directly addressed to teachers and supervisors, and impresses one as having been written from the standpoint of definite problems, which have been met with in the schoolroom, rather than from the standpoint of the pedagogy of the school subjects. The scientific principles upon

which right method, and the selection and organization of subject matter rest, are liberally drawn upon, but always as explanation or justification for a proposed solution to a problem. The problems of what to teach; when and where to begin it; what shall be its aim; how to present it; what devices are useful in this or that connection; when, how, and for what to test; how to eliminate useless material from the text; how to supplement the text; how to develop a right motive; how to supervise study; how to connect school work with community service; how to make the work concrete; where to find materials for illustrative purposes; how to correlate one subject with others; how to teach a child to reason; when and where to emphasize drill in number work; how to make a lesson assignment; etc., are typical of departure for discussion throughout the book. These are problems with which every teacher is confronted in her daily work, rather than problems of educational theory. Thus the book is itself an excellent illustration of just the sort of procedure it advises teachers to follow. Not only have the authors stated these problems clearly, but they have outlined modes of procedure, to explain which an abundance of excellent illustrative materials have been bought into the book. Thus in explaining the proper use of an arithmetic text, it is not only suggested that children must be taught to draw upon the real reservoir of mathematical problems, which is the life of the school and of the community, but accompanies this explanation with typical problems of the kind suggested.

The book is quite as strong in its discussions of common fallacies in teaching. Not only have such fallacies been selected with a view to show up the false principles involved, thus enabling the teacher to carry the idea over into other teaching situations, but nowhere are we confronted with pages of "dont's."

Such errors as appear in the first problem on page 185, and such inadequate discussion of a difficult task, as teaching how to carry in addition, P. 188, are rare, and of minor consequence. The book is written in clear and simple language, and will be appreciated not only for its sound discussion of practical schoolroom problems, but also for its rich suggestions and illustrations, its abundance of hints as to sources of materials, and for its detailed reading lists.

The book is published as one of the series of Riverside Textbooks in Education, edited by Dr. Cubberley of Stanford University.

J. B. SEARS.

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THE

JOURNAL OF EDUCATIONAL PSYCHOLOGY

INCLUDING EXPERIMENTAL PEDAGOGY, CHILD PHYSIOLOGY AND HYGIENE, AND EDUCATIONAL STATISTICS

Edited by

W. C. BAGLEY, C. E. SEASHORE,
J. CARLETON BELL, Managing Editor GUY MONTROSE WHIPPLE.

Published monthly except July and August by
WARWICK & YORK, INC.,
LANCASTER, PA. BALTIMORE, MD.

Manuscripts for publication, books or other material for review, and news items of interest to educational psychologists should be addressed to The Managing Editor, J. Carleton Bell, University of Texas, Austin, Texas. Research contributions from England may be sent to W. H. Winch, Esq., Melville Villa, Overhill Road, Dulwich, London.

The Journal is issuing a series of Monograph Supplements for the publication of more extensive researches in educational psychology. For details prospective contributors may apply to Guy Montrose Whipple, University of Illinois, Urbana, Ill.

The price of the Journal is $2.50 per year of ten monthly issues. Foreign postage is 20 cents extra for Canada and 30 cents for other countries in the Postal Union.

Subscriptions and correspondence concerning business matters should be sent to Warwick & York, Inc.

VOLUME VII MAY, 1916 NUMBER 5

EDITORIALS

THE FALLACIOUS CURVE

We are all familiar with the seductive danger lurking in a show of figures. Figures may not lie, but they may very well lead him who seeks their interpretation into sophistries of which he would be innocent without their inducement. When figures, and particularly averages, are summarized in graphic form, the resulting 'curves' seem to be even more seductive than the figures from which they were derived. There is a story, whether authentic or not, I cannot say, to the effect that when Quetelet first gathered data on the stature of the sexes at various ages, he was irritated because the girls exceeded the boys in height in early puberty, and forthwith corraled sufficiently many short girls and tall boys to correct this 'error' in his curves. There we find an expert who thought he knew beforehand how his curve should run and corrected his observations until they fitted his preconceived notions. In a recent exposition of some of the results of the Cleveland Survey it was shown that in some schools speed in writing mounted fairly smoothly from grade to grade, whereas in other schools, speed in certain grades either showed no augmentation or actually fell off.

It was explained that in these grades unusual effort had been expended upon quality of writing and hence quantity had suffered. That much we may admit; but how can one deduce from these curves the further conclusion that the steadily ascending curve is the *proper* one which all the schools should take as their pattern for improvement in handwriting? Possibly it is, but the curves do not prove it. On the contrary, one might argue, merely as a theoretical hypothesis perhaps, that the best ultimate improvement will result if in certain grades attention is given quite predominantly to improvement in quality and to a sufficient extent to slow the writing during that school year. I do not pretend to possess any expert knowledge upon this particular classroom problem, but I do wish to protest against the process of extracting from curves more recipes for school practice than the data will warrant.

G. M. W.

SCHOOL PROGRESS OF GIFTED CHILDREN

When Professor Stern's discussion of *The Supernormal Child* appeared in this JOURNAL in 1911, special classes for gifted children were in operation in not more than a half-dozen American cities, and these classes were restricted, so far as I am aware, to the so-called 'preparatory-centers' designed for shortening the work of the 7th, 8th and 9th grades to two years in the cases of selected pupils ranking somewhere in the top quarter or top third of the 6th grade. In the last five years there has been a slow growth of the movement for segregating pupils of superior ability; classes for these children can now be visited in perhaps fifteen or twenty cities. Their development, needless to say, raises numerous problems, administrative as well as pedagogical and psychological, nor have we made even a satisfactory beginning in the solution of many of them. Experience at Cincinnati and at Louisville appears, however, to answer one question of some interest; viz., is it possible and is it desirable to institute special classes for gifted children earlier than the sixth grade? On *a priori* grounds, I believe a good case could be made out for an affirmative answer. In so far as progress through the lower grades is mainly dependent on facility in acquiring the various 'tools' of study, with relatively less need or possibility of supplementing routine classroom work by various 'excursions' into accessory materials, it would seem probable that the shortening of the time expended by extra-competent pupils would here be not only free from objection,

but positively desirable. That this theoretical assumption is substantiated in practice is sufficiently evident from observation of the work of the special fourth-grade class at Louisville, Kentucky. Here the best four or five per cent. of the previous third-grade pupils in several buildings are assembled in single a group and complete the fourth-grade work in one-half the school year without the slightest difficulty. Their subsequent progress in the grades is all that could be expected. It is not without interest to note that Petzoldt, the German authority in this field, defines a gifted child as one who, without detriment to his health, can accomplish two years' work in one. His prediction that 10 per cent. of German pupils could exhibit this grade of efficiency suggests that probably even more pupils could be drafted into special classes than has been attempted at Louisville.

G. M. W.

NOTES AND NEWS

To what extent may field work be profitably carried on in higher education? The medical school has for years had its post-graduate connection with the hospital which provides field work for the young intern; normal schools and departments of education require practical work of their students as pupil teachers; co-operative courses in engineering have been developed, with part time in college and part time in real, commercial work; and now departments of economics, sociology, and government are devising ways of giving their students practical instruction through field work in official bureaus, social settlements, and city departments. Some educational authorities who favor laboratory instruction within college walls do not consider it wise to devote part of a student's time to outside field work. They hold that the innovation is not a mere extension of the laboratory principle, but an entirely new principle. The advocates of field work are divided on the question of what constitutes field work, some holding that the field work of others is mere inspection and observation, not true work at all. No considerable group has agreed upon a standard definition or scale of credits toward graduation. The Association of Urban Universities has appointed a committee of nine prominent educators to make an extensive investigation and report on the value of field work, the wisdom of recognizing it with college credit, the methods of conducting it, the selection of students, organization of their work, correlation with formalized instruction, and the branches in which it may be used to advantage. The chairman of the committee is President Parke R. Kolbe, Municipal University of Akron, Ohio, and the committee will welcome reports and other information from persons and institutions interested in the general problem.

The Committee on American Speech, of the National Council of Teachers of English, calls attention to the April issue of the *Journal of Ophthalmology, Otology and Laryngology*, of Cincinnati, which is devoted to a symposium on speech, voice, and hygiene of the vocal tract by representatives of professional and commercial circles. There are articles by leading physicians, public school executives, by Otis Skinner for the actors, and by representatives of the Chicago Telephone Co., Marshall Field and Company, etc. It is a broad

survey of these subjects from the point of view not of the professional teacher of speech, but of the public. It should prove of interest alike to the schools and to the general reader.

Under the directorship of Dr. Charles S. Berry, of the University of Michigan, special courses will be given for teachers of backward and mentally defective children at the Michigan State Normal College, Ypsilanti, during the summer session. They will include courses in mental deficiency, psychological testing, methods of teaching backward and defective children, speech defects, etc.

Dr. Nathan Oppenheim, the author of several books and numerous articles on the development, the hygiene, and the diseases of the growing child, died in New York City, on April 5, aged fifty-one years.—*Science.*

Dr. Milo B. Hillegas, associate professor of elementary education in Teachers College, Columbia University, has been appointed commissioner of education for the State of Vermont, and will assume the duties of his position about July 1.—*School and Society.*

Dr. Lewis M. Terman, associate professor of education in Stanford University, has been promoted to the rank of full professor in that institution.

Dr. H. L. Hollingworth has been advanced from assistant professor to associate professor of psychology in Columbia University.

Dr. Robert Morris Ogden, professor of psychology at the University of Kansas, has been appointed professor of education at Cornell University.

Dr. W. S. Foster, instructor in psychology at Cornell, has been made assistant professor of educational psychology.

Dr. Frederick G. Bonser, associate professor of industrial education in Teachers College, Columbia University, has been promoted to a full professorship of education and given charge of the courses concerned with the elementary school curriculum. Special attention will be given to the needs of supervisors of vocational and rural schools.—*School and Society.*

CURRENT PERIODICALS

SCHOOL AND SOCIETY. Vol. II, No. 49, December 4, 1915. IRVING KING. *An Inquiry into Certain Aspects of the Study Habits of University Students.* 824–828. A questionnaire was carefully prepared to bring out the student's understanding of the assignment, the length of time spent in preparation, a chronological account of the different things done in preparation, a statement as to whether this was the usual preparation, and an indication of the presence or absence of a definite study program. This questionnaire was answered by students from 56 classes in 1914 and 19 classes in 1915. The results are shown in the form of graphs and tables. There was no correlation between ability and time spent on the single lesson in question.

No. 50, December 11, 1915. L. W. SACKETT. *Measuring a School System by the Buckingham Spelling Scale.* 860–864, 894–898. The scale values were worked out for five of the Buckingham lists, the words were thrown into sentences and these sentences dictated to each class of two school systems. The ranking of each half grade in each of twenty-four schools is indicated and graphs show the distribution of pupils for school grades three to seven, in these schools. Girls showed superiority over the boys in all grades varying from .3 to 3.9 scale units.

No. 52, December 25, 1915. KATE ANTHONY, MARY L. MCGAHEY, AND EDWARD K. STRONG, JR. *The Development of Proper Attitudes Towards School Work.* 926–934. A test of the results of special coaching in arithmetic for four months. Four cases are reported in detail with clinical case studies, records of improvement with standard tests and an analysis of the difficulties encountered. An excellent example of the use of objective tests in educational diagnosis and treatment.

Vol. III, No. 53, January 1, 1916. FREDERICK J. MANN. *Eye Strain and Retardation in School Life.* 33–36. The literature of myopia in connection with the schools is a very extensive one, but the present careful study of 191 eye cases shows that hyperopia is five times as prevalent as myopia, and is a much more serious cause of eye strain and of retardation in school. All truants and school laggards should be carefully studied for hyperopia.

No. 54, January 8, 1916. ROBERT COMIN. *Teachers' Estimates of the Ability of Pupils.* 67–70. A series of twenty-three arithmetic problems was arranged in order of difficulty by twenty teachers, and each teacher made an estimate of the per cent. of the class that would solve each problem in ten minutes. The problems were then given to fifteen hundred pupils in the fifth, sixth, seventh, and eighth grades, and their ranking in real difficulty was determined. The coefficient of correlation between this ranking and the combined teachers'

estimates was .74. The author concludes that the judgment of any individual teacher is likely to be erratic, but the judgment of the group is fairly accurate. The estimates of the percentage of pupils that could solve each problem in ten minutes showed much greater variation than the ranking of the problems.

No. 55, January 15, 1916. H. Y. BENEDICT. *Grades and Their Standardization at the University of Texas.* 105–107. A comparison of the grades given to freshmen and to upper classmen for the last five years. On the basis of this tabulation the university faculty has adopted a standard distribution of grades for all classes that have more than ten members.

No. 56, January 22, 1916. THOMAS R. GARTH. *A Statistical Study of the Contents of Newspapers.* 140–144. The daily issues of twenty-seven representative newspapers were examined to determine how many column-inches were devoted to each of thirty-three topics so selected as to include practically all of the solid reading matter found in the papers examined. From this the percentage of the total space was computed and the amount of variability determined. A consideration of the different percentages and of the fluctuation of different topics is interesting.

No. 58, February 5, 1916. J. E. WALLACE WALLIN. *A Census of Speech Defectives Among Public School Pupils.* 213–216. The article reports the results of a census of speech defectives among 89,057 public school pupils of St. Louis, in which the data were gathered through a questionnaire sent to the principals of all the schools. The total number of speech defectives was 2,536, or 2.8 per cent. of the total enrollment. The article presents the relative frequency of the different speech defects, their relation to sex and to left-handedness. The total number of stutterers was 683, or .7 per cent. The boys show a striking preponderance in all types of speech defect, but the results fail to establish any connection between speech defect and the coercion of left handed children to write with their right hands.

No. 61, February 26, 1916. JOHN T. MCMANIS. *Individual Differences in The Early Grades.* 289–295. The author gives due credit to the flexibility of the course of study in the high school and the upper elementary grades, but deplores the rigidity and formalism of the work in the lower grades. It is particularly in the grades below the sixth that the taste for study or dislike for it is established and that the fundamental habits of thought are fixed. The exodus from the schools in the sixth, seventh, and eighth grades is due primarily to improper training and the arousal of a hostile attitude toward school work in the lower grades. The author pleads for a more careful study of individual differences in those grades and a better adaptation of school work to individual needs.

ABRAM LIPSKY. *School Guidance by Mental Tests.* 320–324. The author tested 247 boys with an association test involving the pairing

of Italian-English words. A number of these boys were also tested with several of the Woodworth-Wells association tests. The Pearson coefficient of correlation between Italian-English association and examination marks in German was .53.

No. 62, March 4, 1916. C. J. ANDERSON. *Is the Exemption System Worth While?* 357–360. The author finds the exemption system deleterious in its effect upon the rigor of teachers' gradings, and in its effect upon the quantity and quality of the work done by the pupils.

THE SCHOOL REVIEW. Vol. XXIII, No. 10, December, 1915. H. V. CHURCH. *An Experiment in Cooperation in English.* 670–678. All the teachers in the high school were enlisted to train the pupils in three aspects of work in English; first, subject spelling. Lists of words difficult to spell were made out for each subject, and a small portion of the recitation time in that subject was devoted to the spelling of these words. Second, meanings of words. Special lists of words were constructed for their relationships of meaning, and pupils were asked to invent sentences to indicate that they knew the meanings. Third, recitation English. Certain rules were formulated for the guidance of each teacher in order to secure the best possible English expression from the students. There are four charts showing the grades in special subjects and the English grade of the pupils computed by the teacher in each special subject.

DANIEL STARCH. *Some Experimental Data on the Value of Studying Foreign Languages.* 697–703. At the University of Wisconsin the scholastic records of students who enter with Latin are less than one per cent. higher than those of students entering with German. The English vocabulary of those who had studied Latin was 2.7 per cent larger than the vocabulary of those who had not studied Latin. The study of foreign languages materially increases a student's knowledge of English grammar, but only slightly increases his ability to use English correctly.

Vol. XXIV, No. 1, January, 1916. H. O. RUGG. *The Experimental Determination of Standards in First Year Algebra,* 37–66. As an outcome of the work of a committee of the mathematics section of the Illinois High School Conference an attempt was made to work out a scale for algebra problems, both mechanical and applied, whereby the results of one-year's high school algebra might be measured. The article presents a general classification of the subject matter of first year algebra, and a discussion of the fundamental criteria for the design of an algebra scale. The test series adopted contained eight specific tests of twenty-five problems each and twenty-five general or applied problems. These tests were given to 518 pupils, and the results were scored for the number attempted and the number right. The paper presents tables of the number and types of errors and the psychological principles underlying these types. The

author concludes that inefficiency in algebraic solution is due primarily to lack of mastery (habitualization) of a few typical operations which recur frequently in such solution.

No. 3, March, 1916. H. D. KITSON. *Psychological Tests and Vocational Guidance.* 207–214. The author believes that if we are really to guide young people in their choice of a vocation the individual should be measured from every standpoint—physiological, psychological, sociological, and economic. Each of these views of the individual is only partial and all must be taken in order to ascertain the true relation. The author surveys the work of Dr. Woolley at the Vocational Bureau in Cincinnati, of Dr. Weidensall in New York City, and of Dr. Walter Dill Scott of Northwestern University. He objects to the pigeon hole method of placing the pupil for his future vocation, and urges the adoption of the *monitory* conception of the function of guidance bureaus.

JOURNAL OF EXPERIMENTAL PSYCHOLOGY. Vol. 1, No. 1, February, 1916. HERBERT WOODROW. *Outline as a Condition of Attention.* 23–29. In this paper the author compares the effect of definiteness of outline upon sustained attention by the objective method of reaction time with the results obtained from subjective introspection. By both methods it is found that an illuminated area of a given intensity has a greater effect upon attention when it has a definitely outlined form.

GRACE HELEN KENT. *A Graded Series of Geometrical Puzzles.* 40–50. It has been pointed out that the Binet tests of intelligence are predominately verbal, and it is desirable to supplement these by tests into which the verbal element does not enter. The author has devised a series of twenty-four puzzles consisting of rectangular or triangular pieces of wood. Each puzzle when solved forms a square and the task is to fit the pieces into a frame ten centimeters square. A table presents the results of using these puzzles with twenty-five individuals ranging from six to seventy-five years of age. The test is an interesting one and is worthy of a more systematic and extended experimental use.

THOMAS H. HAINES. *Relative Values of Point Scale and Year-Scale Measurements of One Thousand Minor Delinquents.* 51–82. The author presents a brief sketch of the development of the Yerkes point scale and shows the inadequacy of the Binet tests of intelligence. Extended tables and graphs give a comparison of the point-scale and year-scale scores of 671 delinquent boys and 329 delinquent girls. By the Binet scale fifty-six per cent. of the delinquents are pronounced feeble-minded, a finding which the author stigmatizes as grossly misleading. The point scale results show that delinquents yield considerably lower averages than children in the public schools. About twenty-five per cent. of the delinquents are twenty-five per cent. below the normal standard,—thus reducing the Binet estimate of feeble-mindedness by more than half. The author finds the point scale a much more delicate measuring instrument than the Binet scale and advocates its use in mental measurements.

PUBLICATIONS RECEIVED

RICHARD BAERWALD. *Zur Psychologie der Vorstellungstypen, mit Besonderer Berücksichtigung der Motorischen und Musikalischen Anlage.* Leipzig: Verlag von Johann Ambrosius Barth, 1916. Pp. x, 444. M.14.

This study of the psychology of imagery types, with especial reference to motor and musical capacities, is founded on a questionnaire circulated under the auspices of the Berlin Psychological Association. The questionnaire differed somewhat from the usual investigations of that type, in that it suggested a number of specific experiments to be performed and called for systematic introspection on them. The author devotes twenty-five pages to a critical evaluation of this type of investigation, describes in detail the sources of his material and the reasons for selecting the classes of people studied, and surveys the possible imagery types and the reasons for the unsatisfactory outcome of previous experimental investigations. Part Two brings an extended analysis of motor-mindedness, including inner speech, writing and drawing imagery, kinaesthetic reproduction, and the relation of motor tendencies to other aspects of consciousness. Part Three deals with the psychology of musical people, and Part Four discusses the antagonism between the various fields of sensory reproduction. Whether one accepts or rejects the doctrine of imagery types one will find much interesting data in this volume.

FRANK W. BALLOU. *Geography. A Report on a Preliminary Attempt to Measure some Educational Results.* Boston: Bulletin No. 5 of the Department of Educational Investigation and Measurement, 1916. Pp. 38.

The author devised two sets of geography questions, one on the United States, the other on Europe, and gave them to 594 pupils of the upper elementary grades, the high school, and the normal school. The results for each question are discussed in detail, and the distribution of pupils is shown by tables and graphs.

H. A. BROWN. *The Measurement of Ability to Read.* Concord, N. H.: Bureau of Research of the Department of Public Instruction. Bulletin No. 1, 1916. Pp. 55.

A single reading selection was used in all grades above the second to measure ability in silent reading. In scoring the results the selection is divided into forty sections each of which represents a unit of thought. The reading time allowed was one minute and the method of test was reproduction. The monograph contains blanks for reading, frequencies for rate of reading, comprehension, and reading efficiency, and graphic representations showing the results attained in each grade.

ELIZABETH COOPER. *The Harim and the Purdah. Studies of Oriental Women.* New York: The Century Company, 1916. Pp. 309. $3.00.

The author presents an intimate and authoritative account of the status of women in Egypt, Arabia, India, China, and Japan. Many of the fantastic ideas that are generally prevalent regarding Eastern women are here shown to be pure fiction. It is true that the status of woman in these countries is bad enough from the western point of view, but since most Eastern women know no other mode of life they not only acquiesce in their condition but regard with shrinking alarm any proposal to change it. There will have to be a tremendous amount of education of both women and men before Eastern women can play a very important part in social life, and whatever changes may take place will come about as a result of the efforts of the men rather than of the women.

JOHN M. COULTER. *Evolution, Heredity, and Eugenics.* School Science Series, Number Five. Bloomington, Illinois: John G. Coulter, Publisher, 1916. Pp. 133. 50 cents.

This little volume is designed to supplement elementary biological texts and to furnish in brief and simple form a serviceable idea of modern conceptions of evolution and of their significance in human life. There is a discussion of the meaning of evolution, a brief history of the theories of evolution, the fundamental features of natural selection, the theory of mutation, the problems and machinery of heredity, the evolution of plants, the beginnings of animal life, the appearance of air-breathers and vertebrates, the evolution of various organs, and the elements of eugenics. There is great need for a simple manual of this type, and it is to be hoped that in the near future such a course of study will be required of every high school pupil.

STANLEY DE BRATH. *Mysteries of Life. A Book for Boys and Girls.* New York: Chas. Scribner's Sons, 1916. Pp. xvii, 260.

The author of this book is a former head master of an English preparatory school, and his purpose in writing it seems to be to interpret the facts of modern science from a religious point of view for the spiritual uplift of the youth. Part One, entitled "What?" contains two chapters, one on the mystery of the body and another on the mystery of the heavens. Both body and heaven are treated as manifestations of a divine intelligence or creative power. Part Two, entitled "How?" deals with the history of the earth and with human evolution. The author's point of view is summed up in the statement "Every species arose from variations, due to Creative Mind acting in matter." Part Three entitled "Why?" discusses the mystery of sex, the history of pain, the revelation of God, and the mystery of the kingdom of heaven. The book contains much moralizing on the war.

CHARLES W. ELIOT. *Changes Needed in American Secondary Education.* New York: General Eduaction Board, Occasional Papers, No. 2, 1916. Pp. 29.

The author contends that the training of the senses should be the prime object in human education from primary to professional school. An examination of the programs of American secondary schools shows that little attention is paid to this most vital part of education. There is a strong plea for more hand, eye, and ear work, such as drawing, carpentry, turning, music, sewing, and cooking, and the giving of much more time to the sciences of observation, as chemistry, physics, biology, and geography. These sciences are to be taught in the most concrete manner possible. In an appendix many instances are cited to show how insignificant is the time devoted to these observational subjects compared with that gievn to linguistic, literary, mathematical, and historical subjects.

MARION ERWIN. *The Universe and the Atom.* New York: D. Van Nostrand Company, 1916. Pp. 314. $2.00.

"The object of the present work is to furnish an explanation of the physical universe and the atom on simple mechanical principles." The author has endeavored to make the treatment convincing and intelligible to the lay reader as well as to the advanced scientist, and to do this he has explained the main features of wave action in connection with the physical phenomena upon which the wave theory of light rests The author's conclusion is "that in the universe matter is being created by radiations from other matter all the time; that there is going on all the time the gathering up of this unborn matter by gravitation into clusters and suns; that in time these suns go to a kinetic death and finally the matter of which they are composed is converted again into ether substance, thus we have an endless cycle of births, lives, deaths, and resurrections in the material universe."

ABRAHAM FLEXNER AND FRANK P. BACHMAN. *Public Education in Maryland.* A Report to the Maryland Education Survey Commission. New York: The General Education Board, 1916. P. 176.

"In the following pages an effort is made to describe the organization of public education in Maryland, to estimate its efficiency, and to suggest such changes as appear at once desirable and feasible. It is hoped that legislation supplementing and improving the present state system may result, but even should this be the case, public education will continue to disappoint unless higher ideals result from completely divorcing education from politics." Among the topics considered are the state board of education, the state superintendent, the county superintendent, the teachers, attendance, instruction, and financial readjustments.

H. L. GANTT. *Industrial Leadership.* New Haven: Yale University Press, 1916. Pp. xii, 128. $1.00.

How far should the state go with industrial and vocational training? The author contends that the state should give a broad, general training, and that the industries themselves should furnish that more specialized training which individual industries demand. In addition to the chapter which gives the title to the book, there are chapters on training workmen, on the principles and the results of task work, and on production and sales. There are several elaborate graphs and charts in color.

ELIZABETH HARRISON. *When Children Err. A Book for Young Mothers.* Chicago: The National Kindergarten College, 1916. Pp. 177.

This little book deals with that most important of all topics, the establishment of standards of conduct in the mind of the child. The standards are the resultants of two forces, impulses from within and disciplinary treatment from without. The book contains an abundance of anecdotes in illustration of the points made, and a good discussion of different types of punishment.

SHATTUCK O. HARTWELL. *Overcrowded Schools and the Platoon Plan.* Cleveland: The Cleveland Education Survey, 1916. Pp. 77. 25 cents.

The author first describes the Gary plan, shows its excellencies and defects, and advocates the platoon plan as superior. According to this plan, the children are divided into two groups, made up of equal numbers of classes. While one group is engaged in regular school work, the second group is doing special work in special classrooms, in auditorium, gymnasium, etc. At the middle of the morning session the two groups change places. A similar shift is made in the middle of the afternoon. There is a detailed consideration of what the adoption of the platoon plan in Cleveland would involve and of the advantages to be gained. The plan it would seem might be adopted in any large school system.

W. H. HECK. *Health of School Children—II.* Bulletin, 1915, No. 50. Washington: Bureau of Education, Pp. 187.

This is a summary of contributions to the subject of the health of school children appearing in American medical journals from July, 1914 to July, 1915. It will be a great convenience to school hygienists to have brought together the widely scattered articles that bear upon the health of the school child. One finds reports of improvement in the medical inspection of schools, in the control and prevention of infectious diseases, in the measures taken to curb such scourges as infantile paralysis, pellagra, and trachoma, the treatment of tuberculosis, disturbances of the mouth and throat, eye and ear defects,

correction of faulty posture, nervous and mental disturbances, and the supply of food and air.

DAVID S. HILL AND MARY L. RAILEY. *Educational Research in Public Schools.* Annual Report to the Superintendent of Schools, New Orleans: Division of Educational Research, 1915. Pp. 211.

Part One of this report deals with comparative measurements of the progress in school of 36,000 children in New Orleans. There are age grade tables for both white and colored schools, and the data are further presented in the form of graphs. Part Two presents a practical study of the elimination of pupils from school, recounting an attempt to ascertain the actual amount of elimination, to discover by personal visits the causes operative in elimination, and to show the types of pupils who leave the grammar grades. The data are tabulated by months and presented in both tabular and graphic form. Part Three is a study of the ideals of children and the occupational preferences of 7,000 pupils thirteen years of age and older. Part Four presents further studies of individual variation, and Part Five is a note on the Delgado Survey of Industries. This valuable investigation shows what excellent scientific work may be done in school systems when encouragement is given by school authorities.

GEORGE E. JOHNSON. *Education Through Recreation.* Cleveland: Cleveland Foundation Survey, 1916. Pp. 94. 25 cents.

The surveyor reports that Cleveland is extraordinarily well-equipped in recreation plants and in teaching force. He recommends better organization of recess periods, more out-of-door recreation, more free play in the lower grades, organized games in the elementary school, a director of social recreation, a director of plays and games, and a director of the play of young children. The book contains many photographs of recreation activities in Cleveland and many diagrams showing the relative number of those engaging in the various forms of recreation.

CHARLES HUBBARD JUDD. *Measuring the Work of the Public Schools.* Cleveland: Cleveland Foundation Survey, 1915. Pp. 290. 50 cents.

This report involves a scientific study of handwriting, spelling, arithmetic, and reading in schools, and the observation of the instruction in kindergartens, elementary schools and high schools. In handwriting a large number of specimens were collected in grades five to eight which were scored for both rate and quality. The latter scoring was made on the basis of the Ayres Scale. An interesting graph shows the average speed of handwriting and each quality from 20 to 90 for the grades mentioned. All grades showed a steady decrease in speed with increase in quality. In the spelling tests lists of twenty words each were made up from the Ayres Scale and given as isolated words and in sentences. In spite of the claims that have

been made for the teaching of spelling in Cleveland the tests show that the city has only an average rank in this subject. In arithmetic tests were devised in the fundamental operations, somewhat similar to the Courtis tests but more varied and more inclusive. Tests were given in both oral and silent reading, and the comprehension of the pupil was checked by reproduction. The book contains valuable material on educational measurements.

GRACE HELEN KENT. *A Graded Series of Geometrical Puzzles.* Reprinted from the Journal of Experimental Psychology, Vol. 1, No. 1, Feb. 1916. Pp. 40–50.

The author presents a series of twenty-four puzzles consisting of rectangular or triangular pieces of wood so constructed that when the pieces are put together they form a square. This fits into a wooden frame, ten centimeters square, and the puzzles thus partake of the nature of a form-board exercise. Twenty-five subjects were tested, ranging in age from six to seventy-five. The puzzles made of triangles were found to be much more difficult than those made of rectangles. The correlation between skill in solving these puzzles and general intelligence has still to be worked out.

DARWIN OLIVER LYON. *The Relation of Quickness of Learning to Retentiveness.* Archives of Psychology, No. 34, Jan. 1916, 60 pp. 50 cents.

The writer used groups of twenty nonsense syllables according to three different methods. Supplementing these are digits, words, prose and poetry. The subjects were normal college seniors, and members of a university class in experimental psychology. Groups of high school students, grammar school students, asylum attendants, clerks, and business men were used for check purposes. The conclusions emphasize the extreme complexity of the memory process, the high correlation between general intelligence and memory, the difficulty of determining the relation of quickness of learning to retentiveness, and the superiority of girls to boys in learning but not in retentiveness. The first member of a series is always retained longer than the middle members.

DAVID MITCHELL. *Schools and Classes for Exceptional Children.* Cleveland: Cleveland Foundation Survey, 1916. Pp. 122. 25 cents.

The book contains an account of the provisions for exceptional children in Cleveland, the reasons for dividing exceptional children into two groups, the socially competent and socially incompetent, a discussion of the principal types in each group, the role of the Binet tests in the diagnosis of feeble-mindedness, and provisions for the care of the feeble-minded. The author takes a stand against the employment of highly paid teachers for the feeble-minded, since less

skillful, less highly trained, and less expensive teachers attain just as satisfactory results.

WALTER S. MONROE. *A Report of the Use of the Courtis Standard Research Tests in Arithmetic in Twenty-four Cities.* Emporia: Kansas State Normal School, Vol. 4, No. 8, 1916. Pp. 94.

Chapter One contains a description of the tests (Series B), directions for giving, marking and tabulating the tests, and fifty-one tables presenting the results in detail. Chapter Two contains a discussion of standards with suggested modifications of the Courtis standards; Chapter Three an interpretation of city distributions; and Chapter Four the use of individual scores. This is an important contribution to measurements of arithmetical abilities.

JOHN J. B. MORGAN. *The Overcoming of Distraction and Other Resistances.* Archives of Psychology, No. 35, February, 1916, Pp. 84. 75 cents.

When we are thinking, trying to solve some mathematical or practical problem, or reading a book, we like to have it quiet. Is this merely a habit, or is it a real factor in concentration of attention? The problem in this investigation was to discover the way in which a person will react to irrelevant noises which are produced while he is engaged at some task. By an escapement device a series of varied stimuli were presented, to which the subject was required to react in different ways as quickly as possible. The responses were made on ten reaction keys, electrically connected with a recording apparatus. Breathing and pressure records were also taken. Fifteen different types of noise were used as distractions. The initial effect of noise is to retard the speed of work. After this initial retardation there is an increase in speed. Extra effort is put forth to overcome the noise. Articulation is frequently used as a means of overcoming the effect of the noise and of focusing the attention to the work in hand. The changes in the amount of energy expended were much more significant than changes in the time of reaction.

EDITH E. READ MUMFORD. *The Dawn of Religion in the Mind of the Child. A Study of Child Life.* New York: Longmans, Green and Company, 1915. Pp. xi, 111. 50 cents.

This booklet contains many anecdotes and some moralizing but little psychology. It would be very interesting and valuable to have an authentic, first-hand study of the development in the child of ideas about religion. Such ideas would be necessarily imitative and would reflect the religious observances and conversations of those about him. It would be worth while, however, to have an accurate and painstaking account of the way in which this is done. It is to be regretted that the present book contributes so little to that end.

WILLIAM BENNETT MUNRO. *Principles and Methods of Municipal Administration.* New York: The Macmillan Company, 1915. Pp. xvi, 491. $2.25.

The aim of this book is to show how various city departments are organized, what work they have to do, and what problems they usually encounter in getting things done. Among the departments considered are streets, water-supply, waste disposal and sewerage, lighting, police, fire, school, and finance. In school administration, the author notes the tendency toward the reduction of the size of school boards, and the election of members at large or appointment by the mayor or court. The prevailing length of term is from four to six years. The functions of the school board are summarized, and the superintendent's duties are discussed under the heads of selection of teachers, arranging the program of study, and discipline and promotions. There are also sections on municipal school management, the school house and its equipment, centralized control of city schools, school finance, and new demands upon the schools. The imperative need in school administration is a more complete record and a better classification of data.

GEORGE NASMYTH. *Social Progress and the Darwinian Theory. A Study of Force as a Factor in Human Relations.* New York: G. P. Putnam's Sons, 1916. Pp. xxiii, 417. $1.50.

"This book has to do with one or two of the really fundamental questions which concern men condemned to live together in society. . . . The vast and co-operative partnerships of human association do not work toward efficiency by one of the parties exercising compulsion or coercion upon the other, but by free co-operation based upon an intelligent recognition of mutual interests in such co-operation." The author believes that the Darwinian view of social relationships has been grossly misunderstood and misinterpreted, and has written this book to show that the doctrine of force, of might, of power, which the German theorists have proclaimed as the guiding principle of the state from the point of view of evolutionary sociology, is in entire contravention of Darwin's fundamental social idea. Not force but justice and mutual aid must be the watchwords of social progress The book is largely a sociological study of the phenomena of the present war, and takes its starting point from the writings of Novikov and other Russian sociologists.

F. H. NEWELL AND C. E. DRAYER. *Engineering as a Career.* New York: D. Van Nostrand Company, 1916. Pp. xii, 214. $1.00.

This is a collection of papers contributed by eminent engineers on the various activities involved in engineering and the qualities necessary for success. There are papers on mechanical, railway, hydraulic, metallurgical, electrical, chemical, marine, sanitary, bridge, architectural, and mining engineering, and a brief discussion of vocational guidance. The papers are all of the decidedly popular type, and the

book might well be used for supplementary reading in the high school in connection with vocational guidance work.

IRIS PROUTY O'LEARY. *Department Store Occupations.* Cleveland: The Cleveland Foundation Survey, 1916. Pp. 127. 25 cents.

This study of department store conditions will be of interest to other communities besides Cleveland, and will be suggestive to school authorities and vocational guidance bureaus for a similar survey of their own localities. The study includes not only department stores, strictly speaking, but also neighborhood stores, and five and ten cent stores. There is an analysis of jobs and a consideration of the vocational training for department store workers.

GEORGE HENRY PAYNE. *The Child in Human Progress.* New York: G. P. Putnam's Sons, 1916. Pp. xix, 400. $2.50.

This is a novel and enlightening book on the child. The author has painstakingly hunted out from the records of anthropology and early history, and pieced together to make a complete picture for us, the ideas and customs of primitive and early peoples with reference to children. There is a sketch of the development of parental care with illustrations from the higher animals; the restriction of the number of children among primitive tribes; Chinese, Japanese, and East Indian treatment of children; the sacrifice of the first-born in South America and Western Asia; family life in Greece and Rome; the attitude of the early Christians toward children; and the crimes against children in the 19th and 20th centuries. The narrative is almost revolting in its cruelty and bloodthirstiness, and one marvels that the human race has been able to survive its own attempts at self-destruction. It is to be hoped that this sombre picture of the diabolical treatment of children in the past will help to make the 20th century the real century of the child.

FREDERICK E. PIERCE. *Selections from the Symbolical Poems of William Blake.* New Haven: Yale University Press, 1915. Pp. xiv, 79. $2.00.

In this introduction to Blake's poems the author has endeavored to make such a selection as would lead by graduated steps from the simpler and more obvious to the more abstruse and esoteric products of his muse. In so doing he has rendered a distinct service to all who desire to become acquainted with this fantastic genius. Even with such help no little expenditure of effort is necessary to master the involved and exclamatory style.

WALTER REEVE RAMSEY. *Infancy and Childhood. A Popular Book on the Care of Children.* New York: E. P. Dutton and Company, 1916. Pp. xx, 198. $1.25.

The author well says that the old time mysticism which still to some extent surrounds medicine must disappear and the public be-

taught what it may rightfully expect of itself and the physician. He then proceeds to give in the simplest possible words the approved conclusions of medical science on growth and development, the care of the new-born, breast and artificial feeding, teething, diet, exercise, contagious diseases, and various other questions about which it is important for mothers to know.

Report of the Committee on Elimination of Subject Matter. Iowa State Teachers' Association, 1916. Pp. 54.

This report presents abundant evidence that school men are realizing the necessity of omitting many topics that have been taught in the past, and of concentrating attention upon those topics which are of distinct significance in social life. The subjects considered are arithmetic, grammar, writing, geography, physiology, history, and spelling. The discussion of each subject is based upon the results of recent experimental studies.

J. B. SEARS. *Spelling Efficiency in the Oakland Schools.* Oakland, Cal.: Board of Education Bulletin, No. 9, Nov., 1915. Pp. 79. 25 cents.

The Ayres spelling lists, as used in the Springfield survey, were given to forty elementary schools of the Oakland system, embracing 12,982 children. Each child first filled out a blank showing his age, grade, father's occupation and nationality, language spoken in the home, and the occupation the child would like to follow. A blank was also filled out by the teacher showing the time spent on spelling, methods of teaching, assignments, and study of books and articles on spelling. The average for the city, grades III to VIII, was 77.4 which is 7.4 higher than the Ayres standard. Tables and graphs show the standing by schools and grades, the distribution by grades and classes, age-grade distribution and spelling efficiency, spelling ability by age groups, sex and spelling efficiency, general ability in school work and spelling ability, and distribution of spelling ability by home language, father's nationality, father's occupation, and the child's ambition. Chapter five discusses the administration and teaching of spelling from the point of view of results shown by the tests. The correlation between time allotment and spelling ability seems to be slightly negative. This is the most detailed and elaborate investigation of the spelling of an entire school system that has yet been published.

J. W. SLAUGHTER. *The Adolescent.* New York: The Macmillan Company, 1915. Pp. xv, 100. 60 cents.

This little book is dedicated to G. Stanley Hall and is based upon his two volume work on *Adolescence.* The author intends this little book as a sort of introduction to Dr. Hall's work, but assumes complete responsibility for the interpretation of the facts. There are chapters

on growth, development of instincts and emotions, skepticism, unification, juvenile crime, and the education of boys and girls during adolescence.

J. Russell Smith. *Commerce and Industry.* New York: Henry Holt and Company, 1916. Pp. viii, 596.

This book deals with explanations rather than mere facts and statistics. Man's activities are its central theme and the reasons for these activities give rise to the problems treated. How does climate affect man? How does the soil feed him and furnish materials for shelter, heat, power, and industry? How does the form, location, and surface features of the land affect his efforts at trade? The first three hundred pages are devoted to typical industries of the United States. The industries of the remainder of the world are briefly considered in two hundred pages, and the last fifty pages deal with world commerce. This is a stimulating and practical kind of study which should be much more extensively pursued in our high schools than it is at the present time.

Bertha M. Stevens. *Boys and Girls in Commercial Work.* Cleveland: The Cleveland Foundation Survey, 1915. Pp. 181. 25 cents.

This book includes a study of commercial work in the retail store, the wholesale business, manufacturing, banking, civil service, and the small office. On the basis of this data recommendations are made for the commercial training of boys and girls.

Marion Rex Trabue. *Completion-Test Language Scales.* Teachers College Contributions to Education, No. 77. New York: Teachers College, Columbia University, 1916. Pp. ix, 118. $1.50.

This monograph presents the latest development of the Ebbinghaus completion-test into a series of scales of equal or increasing difficulty. Each of these scales has been carefully standardized and the steps are arranged at approximately equal intervals. We have here therefore a delicate and precise instrument for measuring the abilities of pupils in this type of linguistic work. The mathematics involved in deriving the scales and in determining the intervals between the steps are presented in detail.

Howard C. Warren. *A Study of Purpose.* Reprinted from the Journal of Philosophy, Psychology, and Scientific Methods, Vol. 13, No. 1, 2, and 3, January and February, 1916. Pp. 72.

The author finds that the distinctive feature of the purposive experience is the inversion of the usual time order of certain events. The five factors of this consciousness are forethought, assent, potency feeling, the self-notion, and the sense of fitness. Anticipation and fitness are genuine biological phenomena and seem to be limited to living organisms; otherwise, there is no evidence of purpose in nature.